Ref.: WG1_06_2015_77b_Suspension_Questionnaire_2014													
A: Identification						**B1: Is the suspension (shock absorber) test with use of test equipment part of the PTI in your state?** **Some respondents seem not to understand this question. In that case after considering the specifications in the column d an X-mark in red colour has been added into the correct column a, b or c.**				**B.2 On which vehicle categories is the suspension test performed? (it is possible to indicate more than one alternative)**			**B.3 What is th possible to in**
Organization	**State**	**Region**	**Responsible person - name**	**Responsible person - phone**	**Responsible person - e-mail**	**a. yes, it is an obligatory part of the PTI:**	**b. yes, but it is not an obligatory part of the PTI (e.g. it is done only in some PTI centres):**	**c. no, it is not tested at all:**	**d. other (please specify):**	**a. M1**	**b. N1**	**c. other (please specify):**	**a. EUSAMA:**
Bureau Veritas, BIVAC INTERNATIONAL GHANA LIMITED – VEHICLE INSPECTION STATION	Ghana	Africa	LEE RAYMOND BARBER	+233243409126	lee.barber@gh.bureauveritas.com	X			see appendix1,2	X	X		allowed
Agence Technique des Transport Terrestre (A.T.T.T)	Tunisia	Africa	Jedi Jaouadi	00216 71 112200		X						total permissible laden weight < 3,5T	allowed
PUSPAKOM SDN. BHD.	Malaysia	Asia	Anuar Abdullah	+603-20527571	anuar.abdullah@puspakom.com.my	X			mandatory for vehicle which has GVW ≤ 2500 kg	X			allowed
Korea Transportation Safety Authority	R.O.Korea	Asia	Kim Seong-yeon	82-54-459-7512	aisu434@naver.com		X		In case of Korea has no any regulation, We have a service part some inspection center	X			allowed
TASJEEL	U.A.E.	Asia	AHMAD DARDAS	0097143133609	adardas@eppcouae.com			X					
VIETNAM REGISTER	Vietnam	Asia			khanhdt@vr.org.vn	X						All Vehicle	allowed
Vehicle Testing New Zealand Ltd	New Zealand	Australia and Oceania	Alan Raynor	+64 4 495 2581	alan.raynor@vtnz.co.nz			X					
NZ Transport Agency	New Zealand	Australia and Oceania	Ian Baggott	+64 4 894 5069	ian.baggott@nzta.govt.nz			X					
Amt der Niederösterreichischen Landesregierung Abteilung WST8, Landhausplatz 1, 3109 St.Pölten	Austria	EU	DI Georg Hönig	0043/2742/9005/16010	georg.hoenig@noel.gv.at			X					
BM Autoteknik A/S	Denmark	EU	Michael K. Larsen	.+45 8669 2022	michael@bmtest.dk			X					

Applus+ Danmark A/S	Denmark	EU	Poul-Erik Christensen	+4528989504	poulerik.christensen@applus.com			X	We do not use any equipment – the inspector do a visual check, and evaluate chock absorber by the test driving which is mandatory by each inspection. (no measurement units)	X	X	O1, O2, O3, O4, N2, N3, M2, M3 and MC	
Estonian Road Administration	Estonia	EU	Ahto Ilves	+ 372 620 1274	ahto.ilves@mnt.ee			X					
SGS	France	EU	Guy MORVAN	+33 679 475 966	guy.morvan@sgs.com	X				X	X		allowed
CAPELEC	France	EU	Georges PETELET	33(0)6 72 99 41 20	georges.petelet@capelec.fr	X				X	X		allowed
DEKRA Automotive	France	EU	COURANT Rémi	.+33 1 30 69 53 25	remi.courant@dekra.com	X				X	X		
TÜV NORD Mobilität GmbH & Co. KG	Germany	EU	Roger Eggers	+49 511 99861299	reggers@tuev-nord.de			X					
FSD – Zentrale Stelle	Germany	EU	Sven Eckelmann	+49(351)85187300	sven.eckelmann@fsd-web.de		X		The visual/manual inspection of shock absorbers is obligatory, the use of test equipment is allowed, but not obligatory.	X	X	The visual/manual inspection of shock absorbers is obligatory for all vehicle categories	allowed
DEKRA Automobil GmbH	Germany	EU	Reiner Sauer	+497117861-2486	reiner.sauer@dekra.com		X			X	X		
Driver and Vehicle Standards Agency	Great Britain	EU	Dougie Brandon	01179542557	James.Brandon@vosa.gov.uk			X					
AUTOVISION SAKAR S.A.	Greece	EU	DIMITRIOS KATSAROS	0030 210 9966127 (inter. 232)	dkatsaros@autovision.gr	X				X	X		allowed

Applus Car Testing Service Limited	Ireland	EU	Grant Henderson	+353 1 4135900	Grant.henderson@applus.com	X				X	X		forbidden
Ministry of Infrastructure and Transport – Department of Transport – General Direction for Motorization	Italy	EU	ing. Antonio ERARIO	+39 06 41586228	antonio.erario@mit.gov.it			X					
Ministero delle Infrastrutture e dei Trasporti	Italy	EU	Lino TRENTINI	+390118954052	lino.trentini@mit.gov.it			X					
Road Traffic Safety Directorate	Latvia	EU	Aldis Adins	+371 26477722	aldis.adins@csdd.gov.lv			X	Damage of shock absorber is obvious when driving across brake tester (felt the car swings), after this shock absorbers should be checked by pushing on each shock absorber, leakage from shock absorbers should be checked from bottom.				
SNCT	Luxembourg	EU	Claude Turping	+352 357214201	claude.turping@snct.lu			X					
Driver & Vehicle Agency (DVA)	Northern Ireland	EU	Noel Redmond	0044 2890547992	noel.redmond@doeni.gov.uk		X		Yes, a suspension tester is used for all inspections, but is not required by law. The results of the suspension tester are not used as a pass and fail criteria, as yet. The equipment is used by the examiner to identify a defect in the suspension system ,but the examiner must visually see the defect before failing the vehicle i.e. oil leaking from shock absorber or vehicle continues to bounce after being pushed down.	X	X		
ANCIA	Portugal	EU				X						Vehicles categories M1 or N1 and having a mass not exceeding 2.8 tonnes	allowed
TESTEK, a.s.	Slovak Republic	EU	Marian Rybiansky	00421904555890	marian.rybiansky@testek.sk		X			X	X	not specified by the current regulation	
VEIASA	Spain	EU	FRANCISCO FERNANDEZ GIRON	0034955044048	ffernandez@veiasa.es			X					
RYME (Técnicas Reunidas de Automoción)	Spain	EU	Daniel Lozano	+0034 947 297 527	d.lozano@ryme.com		X			X	X		allowed

Swedish Vehicle Inspection Company	Sweden	EU	Andreas Lindh	+46703251708	andreas.lindh@bilprovningen.se			X	Manual tested, no equipment, tested during test-drive (when driving and going down in the roller-brake tester)			Se “d” question 1, M1 o N1 vehicles is tested with our method.	
OPUS BILPROVNING	Sweden	EU	Christer Larsson	0046736-882448	christer.larsson@opusbilprovning.se			X	Function check is done by rocking back and rear. Front shocks rocked with applied front brake. Shock feature is also checked during test runs				
Van Leeuwen Test Systems B.V.	The Netherlands	EU	Jan van der Does	+31(0)765029911	jan.vanderdoes@vltest.com			X	Visual inspection is compulsory (leakage, fixation, if possible push vehicle down, if any doubt; test drive.)	X	X	M1, M2, M3, N1, N2, N3, O1, O2, O3 and O4	
asa / Association des services des automobiles	Switzerland	Europe (outside EU)	Christian Angéloz	0041313508383	angeloz@asa.ch	X				X	X		allowed
APPLUS ITEUVE TECHNOLOGY S.L.	Spain	EU	SALVADOR ESQUIUS MIQUEL	619229677	salvador.esquius@applus.com		X		10 years ago, the Spain’s catalan region had a mandatory use of test equipment. Nowadays is not mandatory the use of test equipment at any region. In some areas, although is not obligatory, the client can ask for an optional suspension test. In this case a shock absorber tester has to be used.	X		N1 that are similar to M1	allowed

ıe method used for the suspension test? (it is dicate more than one alternative)			**B.4 Which units of measurement are used for suspension test evaluation?**		**B.5 What are the criteria for suspension test evaluation? (it is possible to indicate more than one alternative)**			**B.6 What is the classification of the corresponding defect?**			
b. MAHA/BOGE:	**c. other (please specify):**	**d. other (please specify):**	**a. units (please specify):**	**b. other (please specify):**	**a. database of vehicle type specific values (please specify source, e. g. equipment manufacturer):**	**b. universal criteria (please specify, e.g. efficiency min. 70 % or difference between both sides of the same axle not more than 30 %):**	**c. other (please specify):**	**a. minor defect**	**b. major defect**	**c. dangerous defect**	**d. more than one classifications possible, e. g. for some extent minor, above that major (please specify):**
allowed	ACTIA MULLER allowed		Vehicle Inspection Station System uses percentage. Please see appendix 3		ACTIA MULLER / Protechnology software DVLA compliant	Difference between both sides of the same axle not more than 30%.		X	X	X	Appendix 4
allowed			percent %				Effectiveness ≥ 40 %, difference between both sides of the same axle not more than 40 %)		X		
			% efficiency = (dynamic weight) / (static weight) x 100 %		1) vehicle GVW ≤ 2500 kg 2) suspension system with coil spring 3) vehicle without stability control system source of info: i) road transport dept. ii) equipment manufacturer iii) vehicle manufacturer	passing mark: ≥ 25 % for each wheel only			X		
allowed			unit are Hz		We have no evaluation. Equipment manufacturer are MAHA		We are give to people new information. So, suspension test is only show to vehicle inspection information				
allowed	Visual inspection allowed				X						

							If the vehicle is unstable driving around a curve, it is failed. If the chock absorbers are loose or leaking the vehicle also is failed.		X		
forbidden			Efficiency percentage of each suspension (shock absorber not separated of the whole suspension)			Major defect if Efficiency < 5% Minor defect: Efficiency difference on the same axle > 30%		X	X		see B5
allowed	phase shift allowed		% of difference and % of efficiency	tamping ratio is not used by PTI		X		X			
			Results of suspension efficiency measurement are given in percentage			Difference between both sides of the same axle not more than 30%					
allowed			Road adhesion (EUSAMA), theta values (MAHA), damping ratio			Usually the inspectors follow the recommendation of the test bench manufacturers					The classification depends on the type of the detected defect. The following defects are classified as major or dangerous defects: - significant leakage - weak damping - damper obviously defect - mounting insufficient and/or worn out Other defects are rated as minor defects.
allowed	MAHA Theta allowed		MAHA/BOGE: "mm", "%" as arbitrary unit, MAHA Theta: Theta- value			MAHA %: %- value min. 21 % for O.K., MAHA Theta: Theta > 0,1 and difference left / right ≤ 40 % for O.K.					
				efficiency (%)		Criteria per wheel: lower than 21% - efficiency per wheel – major fail Between 21% – 40% – minor fail Criteria between wheels of the same axle: between 15% - 30% difference in efficiency between the two wheels of the same axle – minor fail Above 30% - major fail		X	X		

allowed			Imbalance (30%)			Difference between both sides of the same axle not more than 30 %			X		
allowed				See note at B1(d)			The difference between both sides are used by the examiner to indicate a defect, however the examiner must have visual evidence of a defect before failing the vehicle. Therefore there is no percentage of difference used and the equipment on its own will not determine the test result.		X		
allowed	forbidden: Measurement range < 6mm (Portuguese Regulation)	forbidden: Max. excitement frequency < 16 Hz (Portuguese Regulation)		X		Difference between both sides of the same axle not more than 30 %			X		
	not specified by the current regulation			not specified by the current regulation	X	X (allowed, bot the exact values are not specified by the current regulation)		X			
allowed			Adherence (without units), and percentage (%).			It is not obligatory in Spain, so each PTI can use the values they want.					

	compulsory visual inspection	test drive in case of doubt							X		
allowed				%		Efficacité minimale exigée - 40% Différence maximale G/D - 30% de la valeur la plus élevée Avec une certaine retenue pour les systèmes de suspension pilotée de manière dynamique (selon info des importateurs)			X		
allowed			% Efficiency			When the Spain's catalan region had a mandatory use of the suspension test (1o years ago), the values were: When the efficiency was below 45%, the inspector must confirm the possible defect under the pit. When the difference between both sides of the same axle was between 15 and 30%, it was considered a minor defect. When the difference between both sides of the same axle was more than 30%, I t was considered a major defect.					

	C.1 What is the number of vehicles on that the suspension tests have been performed in recent period for which the statistics are available (e.g. last year)?		C.2 What is the share of above mentioned vehicles with a defect detected during suspension test? (it is possible to indicate more than one alternative)				D.1 If ther include ve
e. different classification (please specify)	vehicles	in the year	a. minor defect (%)	b. major defect (%)	c. dangerous defect (%)	d. undifferentiated defect (if there are no exact data about classification of defects): (%)	a. yes
	10216	2013					
	1500000	2010	70	20	5	5	
major defect which will cause the vehicle fail the inspection	60000 (approximate)	2013		5			
							X
							X
No classification	1669521	2013					

						No statistic for that	
	21000000	2013	less than 1%	less than 1%			
	18801181	2013	no statistic because it is Minor classified				
In France, we only use two classifications : minor or major defect. Difference between both sides of the same axle exceeding 30% is considered as a minor defect. Another defect is called “major malfunction”. Inspectors can select this defect when it’s obvious that the suspension has a major defect (blocked, or inoperative). This defect is classified as a major defect. This defect is not directly related to a specified efficiency but an efficiency near 0% or near 100% or unusual for the type of vehicle can help to detect a major malfunction.	4300000	2014	3,09%	0,47%			
							X
							X
no direct relation to classification because of not mandatory testing - by decision by the test inspector	approx. 80000	2013 and 2012, both years				2,80%	X
	approx. 500.000 per year	Last two years	Criteria per wheel: front left: 0,26%, front right: 0,40% , rear left: 2,1% , rear right : 2,86% Criteria between wheels of the same axle: front axle: 1,41% , rear axle: 3,5 - 4%	Criteria per wheel: below 1% Criteria between wheels of the same axle: front axle: 0,9% , rear axle: 0,12%			

	1.2 million Vehicles (passenger vehicles, up to 8 passengers)			3%			
	approximately 700,000					As there is no pass fail criteria associated with equipment, it is not possible to give a percentage of defects. Any suspension defects are a result of the visual inspection and not the equipment.	
		2013		sampling 1,8 %			
It has not got classification.							

	Malheureusement aucune statistique disponible pour la Suisse						
	During 2014, 68 suspensions tests have been performed. Some of these tests were PTI, other ones were voluntary inspections and other ones were inspected as a part of the inspection of a reform. All these inspection tests were done only to help the visual inspection.						

re is no suspension test during the PTI in the present, is there intention or plan to introduce it? (please specify, if the answer is yes then ehicle categories involved and considered methods)			**E.1 According to the opinion of your organisation is it appropriate to include the suspension test into the scope of the PTI?**		**E.2 Have you done or been participating in research, studies or analysis in connection with the benefits of the introduction of suspension test into the scope of the PTI? (if the answer is yes, please specify)**		
specification for "yes"	**b. no**	**specification for "no"**	**a. yes**	**b. no**	**a. yes**	**specification for "yes"**	**b. no**
			X				X
			X				X
			X				X
We would like to accept new techknowlodgy in Vehicle inspections. For the safety or increase safety				X	X	We would like accept it soon	
Light Vehicles only–M1			X				X
			X		X		
	X	The New Zealand Transport Agency (Government Department) will be reviewing this requirement in conjunction with inspection organisations in 2015	X				X
	X						X
	X	If there will be a change in the EC- directive 2009/40 and test equipment and testing of shock-absorbers will be mandatory Austria will also fulfil this requirements. Today there is no discussion about this theme	X				X
	X		X				X

	X	We have no intention to introduce equipment to check out the chock absorber before it will be demand by The Danish Transport Authority		Not more than now			X
			X				X
			X		X		
			X		X	Part of the EGEA working group	
			X				X
For M and N vehicles (passenger cars, trucks, busses) in the near future with PTI adapter. Tests have already begun.							
The visual/manual suspension test for M1- and N1-vehicles will be complemented by a new test method using a PTI-Adapter (PTI-specific scan tool with accelerometer and rotary state sensor) as test equipment. The new method consists of the analysis of vehicle's body movement (measured with the PTI-Adapter) caused by a speed bump crossing. Details: WG1_04_2014_043_FSD_suspension test_EN.pdf			X		X	Evaluation of existing methods Research & Development of the suspension test mentioned in D.1.a Research regarding the question at which point the vehicle suspension has to be considered insufficient (investigation of road safety as an objective measure)	
There are activities to integrate performance testing by use of a new method developed by FSD					X	Internal studies by DEKRA, cost-efficiency evaluations in Germany	
	X			X	X	As part of attendance at CITA working groups and assess the benefits of specific equipment at the request of equipment manufacturers	

			X				X
	X	However, to introduce suspension test during PTI is considered worthwhile and to be evaluated more in deeply					
	X	At moment we are evaluating solutions and problems	X				X
	X	Shock absorber test equipment is not covered by PTI Directive 2014/45/EU. Until now real test methods and/or limit values for defect categorization are not set.		X			X
	X						
				Not until a common principle of testing is established and proven.			X
			X				X
	X	The introduction of the suspension test as obligatory is not very probable without back-up in the Roadworthiness Directive		X			X
	X		X				X
	X	Some PTI have the equipment to make the suspension test or have their installations prepared to have a suspension test in the future, but nowadays there is no direct intention to introduce it obligatory.	X				X

				X	X	Demonstrations and tests at many different manufacturers.	
	X	Not what we are aware of					
Is not clear yet		Is not clear yet	X				X
			X				X
	X		X				X

E.3 Your comments:
I strongly believe it is essential that all suspension component be tested during vehicle examination, the poor road conditions and aggressive driving here in West Africa and Africa continually push the suspension to its limits. Although over looked and considered minor fault suspension and more importantly modern suspension / braking system play even more active role to the integral safety of the vehicle. Lee Barber, CMILT,Engtech SOE ,IRTE,LCGI.
Suspension system of vehicle is categorised as safety item where the system will ensure stability of vehicles. Vehicles may overturn due the failure of the suspension system.
We want to simulate, “why we need a suspension test in Vehicle inspection?”
At present we only have a visual and cursory performance inspection of suspension at PTI
In Denmark the test of suspension is done manually. In general, the PTI operator is conducting a “Step” pressure on the vehicle body and monitoring the suspension reaction visually. As a rule of thumb the suspension is considered OK, if there is a reaction of maximum 3-4 vertical movements before the body is at rest. However this method is supported by any underbody visual observations of the condition of the components of the suspension system.

Aware that some suppliers have developed a test bench which seem to be able to separate shock absorber efficiency and whole suspension efficiency. No cost/efficiency analysis already available - French ministry of Transport does not give any information about its will to implement this complementary test in the future.
Main challenges are: - lack of data by vehicle manufacturers, suspension data is not included in type approval, - a lot of different methods of suspension testing with results not fully comparable
Suspension test is a vital part of the PTI however the results cannot be interpreted without the visual check of the suspension system of the vehicle and additionally without assessing the weight distribution between the front and the rear part of the vehicle. Sometimes you can understand if something is wrong by simply hearing of the sound produced from the forced vibration of the wheel.

Only use imbalance between left and right. System needs to be improved so that we measure and evaluate the actual performance of the suspension.
No comments
Comment concerning answer on question E.1 – there are no technic and economic reasons to introduce suspension testing equipment (when talking about suspension testing machine mounted in floor) which requires additional space on testing line and significant investments, because severely damaged shock absorbers we can identify by methods mentioned in question B.1.
If a common principle of testing the suspension is established and proven (I know you are all working hard on this matter) DVA would be interested in including such test in the PTI. To date the difference between left and right is the only criteria that is usable, therefore if both shock absorbers are defective this method is not suitable to identify a defective suspension.
Currently we do have only visual inspection of suspension. To start a discussion about the introduction of suspension test with use of test equipment we should first reach some common standard for suspension test benches and have a cost-benefit analysis indicating effectiveness of such step.
It is very difficult to measure the suspension because each vehicle has different type of suspension.

Our company opinion is that costs of equipment and installation is not motivated according to the value that an objective method gives compared to the subjective method we use.
Limit values must be vehicle individual and it is not only the shock absorber that is tested, it is the hole suspension system with springs, bearings etc.
The range between value for a for new vehicle to the limit for PTI failure (se below) is very wide and it is very hard to prove exact what a certain value does for stopping distance and road holding.
The limit for fail in PTI, meaning when the suspension and shock absorber is so worn out that it is a direct and obvious noted safety matter, must be relatively high. When it has gone so far it can easily been detected (worn out shock absorber) with the subjective manual method.
Above described opinion demands a PTI-system/companies where you have high educated independent inspectors who you trust.

Please note that Van Leeuwen Test Systems B.V. is not an inspection organisation