

## REPORT FOR TRAINING COURSE ON Verification of Weighbridges

**Dates:** 26-29 September 2017

**Venue:** Yongan Hotel and Changping Campus of NIM, Beijing

**Host:** National Institute of Metrology, PR China

**Trainers:** Dr Hu Manhong, NIM, PR China  
Dr Zhong Ruilin, NIM, PR China  
Mr Julian Crane, MBIE, New Zealand

### 1. Objective of the Training

This course will enhance the technical capabilities of participants and provide them with harmonized procedures for testing weighbridges which are aligned with OIML Recommendation R76. Participants will observe demonstrations of the verification of a weighbridge. Participants will receive electronic copies of training materials which they can use when they train others in their economy.

### 2. Target Group

The target group was inspectors or industry representatives who verify weighbridges and staff with responsibility for training in the verification process.

### 3. Description of the Training Course

This training course was held in Beijing over 4 days. All training was conducted at the Yongan Hotel where the participants were staying. The agenda for the 4 days is shown in Annex 1. It was attended by 26 participants from 13 economies, a full list of participants is shown at Annex 2. Two trainers from the NIM Changping Campus and one from New Zealand supported the learning of the participants.

Day 1: Participants were taken to the NIM Changping Campus where the opening ceremony was held. Ms. Zheng Huaxin, Director of Dept. of Metrology, welcomed the participants and wished them a very successful training program. This training would provide them with the opportunity to learn how to test a weighbridge and to exchange ideas with others from within the region. Each economy was invited to make a short economy report explaining how they verify weighbridges. These reports are summaries at Annex 3. Participants were then given a tour of the Mass Laboratory and the Type Approvals Laboratory. Later they returned to the hotel.

Day 2: This was a full day held at the hotel in classroom style where the focus was on learning the test procedures.

Day 3: During the morning session the trainers concluded the discussion regarding the test procedures. In the afternoon participants were taken on a site visit to Wanji Industries who manufacture in-motion truck/vehicle weighing equipment

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Day 4: Participants went to the NIM Changping Campus for closing ceremony, presentation of Action plans, issue of Certificates. Mr. Pu Changcheng, APLMF EC member/OIML AG Chair officially closed the course. In the afternoon participants went on a tour of the Great Wall. Annex 4 contains the action plans submitted by participants.

### 4. Highlights/ Lessons Learned

The people who attended this training were the right people and did appreciate the experience. The agenda was not followed however, the contents of training course covered all the essential part of training as advertised, including construction of weighbridges, calculating maximum permissible errors, visual inspection, repeatability, eccentricity, accuracy of Zero and tare device, weighing test, weighing test using substitution material, calculating the actual weight of the substitution load and Supplementary Test. From the feedback of the participants, they do get a better understanding of verification of weighbridge after the training course.

The breakdown of how the time was used is as follows:

Activity	Time h
Adminstration / Ceremonys / Economy presentations	9.25
Training	9
Site Visits, NIM Changping Campus, Wanji Industries, Great wall	14
<b>Total</b>	<b>32.25</b>

The economy reports give some precise information about the legal metrology situation in each economies, however, it is becoming clear that the economy reports are not as valuable as they were previously. They were originally designed to ensure trainers had more information about each economy and they also had an appreciation of how well the participants understood english. Participants are putting in too much information about their organisations into their talks and this means they are taking too long. In future the information reagrding how each economy manages verification could be requested at enrolment and tabulated in advance so the trainer can discuss it at the start of the meeting. This should take no more than 30 minutes of the training time.

For this training it would appear the agenda was not followed, although the trainers explained in detail the test procedure for verification using the substitution method, and the participants responded positively to the principle of substitution method in verification. It is regretful that participants did not see a real weighbridge being verified. Site visits were substituted for practical experience showing how to verify a weighbridge. The site visits, although interesting technically were not completely relevant to the course subject matter and consumed a lot of time in travel in and around Beijing. It would have been more relevant to show a practical demonstration of testing a weighbridge as this would have been far better as this would have demonstrated the inherent practical difficulties an inspector would encounter in real life. Demonstrating using a simulation with a shop scale while it has merit, does not replace the real experience. While participants appreciated these visits they were requesting the course should have been longer. If the agenda had been followed the time allocated should have been adequate.

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The opening and closing ceremony's were held off-site at NIM Champing Campus and this also involved a lot of downtime travelling to and from the hotel.

In future organisers should be advised they must follow the agenda unless they have received permission from APLMF Secretariat to modify it. It would be worthwhile to adopt a model for allocation of time for future agendas to ensure Training time is at least 70% and Administration is no more than 30% of total time. This would provide a guide for better use of time, thus ensuring the focus is directed more on the course objectives.

New Zealand showed a draft version of the new eLearning modules that are currently under development. There was considerable positive feedback from participants both informally and formally around these as a training tool. The visual nature of the training crossed the language barriers. The audio within the modules is slowly regulated and clear with little accent and ties in real time with the visual of the video.

Participants wanted continued contact with other participants and trainers after the course was finished and people returned home. It was proposed that a Forum could be created and hosted on the APLMF website where moderation would be by the trainers. This would form a library of comment/training material and answers/and a place for participants to seek advice or comment after the course finishes. It would also have the benefit of increasing traffic to the APLMF website for the use of other resources etc.

Formal feedback collected from the participants from the participants is found at Annex 5. This shows the participants did value this training but would very much like to have seen a weighbridge being verified in the field. IN 2018 a NAWI course has already been planned. It would eb very useful to include a practical component showing an actual practical verification of a weighbridge.

### 5. Next Steps/ Follow-up

Participants provide an update on their action plans which are shown at Annex 4.

APLMF needs to implement the following suggestions for MEDEA 2:

- Consider a post course forum
- Monitor agendas to ensure 70% of time is focused on training
- Remodel enrolment form to collect data on how verification is currently conducted.

## Annex 1: Workshop Program

### Course on the Verification of Weighbridges 26–29 September 2017 Program

Venue: NIM Changping Campus and Yongan Hotel

<b>Day 1</b> Sep 26 Tuesday	08:30–09:00	Registration
	09:00–09:30	Welcoming address from the host economy Opening ceremony (APLMF Secretariat) Group photo taking
	09:30–10:30	Presentation by each economy
	10:30–11:00	<i>Coffee break</i>
	11:00–12:00	Presentation by each economy
	12:00–13:30	<i>Lunch break</i>
	13:30–15:00	Construction of weighbridges
	15:00–15:30	<i>Coffee break</i>
	15:30–17:00	Calculating maximum permissible errors
	18:30–21:00	<i>Welcome Dinner</i>
<b>Day 2</b> Sep 27 Wednesday	09:30–10:30	Visual inspection, Repeatability, Eccentricity
	10:30–11:00	<i>Coffee break</i>
	11:00–12:00	Accuracy of Zero, Discrimination, Weighing Test
	12:00–13:30	<i>Lunch break</i>
	13:30–15:00	Weighing Test using Substitution Material, Calculating the actual weight of the substitution load
	15:00–15:30	<i>Coffee break</i>
	15:30–17:00	Tare Test, Supplementary Test
<b>Day 3</b> Sep 28 Thursday	09:00–17:00	Site visit and practical observation of a weighbridge at local manufacture
	19:00–21:00	<i>Farewell Dinner hosted by the APLMF Secretariat</i>
<b>Day 4</b> Sep 29 Friday	09:00–12:00	Assessment of participants
	12:00–13:30	<i>Lunch</i>
	13:30–15:00	OIML 76 amendments
	15:00	<i>Concluding ceremony followed by afternoon tea</i>

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## Annex 2: List of Participants

<u>Name</u>	<u>Economy</u>	<u>Institution</u>	<u>Department</u>
Mr. Nidup DORJI	Bhutan	Bhutan Standards Bureau	Nat. Metrology Lab
Mr. Tenzin DORJI	Bhutan	Bhutan Standards Bureau	Nat. Metrology Lab
Mr. Samrach MUY	Cambodia	Nat. Metrology Center, Min. of Industry & Handicraft	Legal Metrology
Mr. Engseak PHE	Cambodia	Nat. Metrology Center	Legal Metrology
Ms. Siteri Raisuni	Fiji	Ministry of Industry, Trade & Tourism	Dept of Nat. trade Measurement & Standards
Mr. Harish Kant	Fiji	Ministry of Industry, Trade & Tourism	National Trade Measurement and Standards
Mr. Yusuf	Indonesia	Ministry of Trade	Directorate of Metrology
Mrs. Rismisari HARFIAH	Indonesia	Ministry of Trade	Development Centre of Metrological Resources
Mr. Tilektesh Begmat uluu	Kyrgyzstan	CSM under ME KR	Laboratory mass
Mrs. Zhyldyz KARYMSHAKOVA	Kyrgyzstan	CSM under ME KR	Laboratory mass
Mr. Muhammad Fadhil SAHROM	Malaysia	SIRIM Berhad	NMIM
Mr. Mohd Juhari ABDULLAH	Malaysia	Ministry of Domestic Trade	Enforcement Div.
Mr. Mohd Suffian MOHD ABASS	Malaysia	Ministry of Domestic Trade	Enforcement Div.
Mr. Purevtogtokh BANZRAGCH	Mongolia	MASM	Dept of verification and calibration of measuring instruments
Mrs. Altantsetseg TSERENOIL	Mongolia	MASM	Metrology Inst.
Mr. Manish Kumar DAS	Nepal	NBSM	Legal Metrology
Mr. Shambhu Kumar JHA	Nepal	NBSM	Standards & Metrology Regional

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<b>Mr. Kiveen SUYCANO</b>	<b>Philippines</b>	<b>DOST</b>	<b>Nat. Metrology Lab</b>
<b>Mr. Bill BOIU</b>	<b>PNG</b>	<b>ICCC</b>	<b>ICCC</b>
<b>Mr. Jeffrey GABRIEL</b>	<b>PNG</b>	<b>NISIT</b>	<b>Metrology Div.</b>
<b>Ms. Faith TAN*</b>	<b>Singapore</b>	<b>SPRING Singapore</b>	<b>Consumer Protection, Weights &amp; Measurement Div.</b>
<b>Mr. Dilruk Gajaba Hewa PATTIYAWELA</b>	<b>Sri Lanka</b>	<b>MUSSD</b>	<b>Measurement Units Standard &amp; Serv.</b>
<b>Mr. Prasanga Suneth DON WEEDAGAMA</b>	<b>Sri Lanka</b>	<b>MUSSD</b>	<b>Measurement Units Standard &amp; Serv.</b>
<b>Mr. Huy LE DANH</b>	<b>Vietnam</b>	<b>STAMEQ</b>	<b>Metrology</b>
<b>Mrs. Hanh PHAN THI BICH</b>	<b>Vietnam</b>	<b>STAMEQ</b>	<b>Metrology</b>

Annex 3 Summary of Economy Reports

Summary of Economy reports									
MEDEA Project APLMF1: Course on Verification of Weighbridges Beijing, China - 26-29 September 2017									
Economy	Legislation	SI	MPE used	Inspector of 3 <sup>rd</sup> pty	Verification periods	OIML compliant	Type approval	Issues	Other
Bhutan	None, Laboratory accredited by NPL, India	Y	R76	Inspector	No	Partial R111 R76 R117	No	No experience and limited resource	
Cambodia	M.L.O.C	Y	Y	Inspector	Annual	Based on R76	No	Type Approval Lack experienced Staff Budgets	
Fiji	NTMA 1989	Y	Y	Inspector	Annual	R76 partial use	Y	Hierarchy of masses , missing F1 Stability of masses	
Indonesia	National Decree	Y	Y	Inspector	Annual	R76	Y	1000 kg per Office	

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Kyrgyzstan	Yes administered by NISM	Y	Y	Inspector		Member	Y	Not disclosed	
Malaysia	Y	Y	Y	Inspector	Annual	Y	Y	Not disclosed	
Mongolia	Yes administered by MASM	Y	Y	Inspector	Annual	Member Use R76		Lack of masses as resource Calibration of masses	Have to use private co. standards
Nepal	Y	Y	Y	Inspector		No Corresponding members	No	Test weights, only 10 T available	Old legislation
PNG	Trade Measurement Act	Y	Y	Inspector	Annual	No	No	Resources	
Philippines	Yes, but not enacted	Y	Y	No	none	Partial to R76	No	Technical capability Legislation	
Singapore	Y	Y	Y	3rd party Verifiers	Annual	Y	Y	none	
Sri Lanka	SRI	Y	Y	Inspectors and 3 <sup>rd</sup> party		Partial to R76	Y	Training and Technology	
Vietnam	STAMEQ	Y	Y	3 <sup>rd</sup> Party	Annual	Y Vietnam DLVN 100: 2002	Y	Only 6 Verifiers Cost of maintaining standards	



**Annex 4 Summary of Action Plans**

Summary of Action Plans		
MEDEA Project APLMF 1: Course on Verification of Weighbridges Beijing, People's Republic of China 26-29 September 2017		
Name	Economy	Action Plans
Mr Tenzin DORJI Mr Nidup DORJI	Bhutan	Train engineers and technicians working in NML in weighbridge procedures as per OIML recommendations. Conduct survey of weighbridges in Bhutan to determine capacity and possible calibration by NML in future. Using the information and training from the course put forward a proposal to the Government for funding for the purchase of Verification standards and resources needed to test weighbridges.
MABING Hui	China	Report back to colleagues, discussion around current method of testing and training course methodology. Implement practice of making a test plan. Test weighbridges according to the local situation. Conduct weighbridge testing to validate method proposed in the training.
Mr Samrach MUY	Cambodia	Submit report on the training course with all training materials to the Legal Metrology Office. Make a request to the Legal Metrology Office to conduct training on weighbridge verification. Prepare training material to be translated into own language for ease of delivery to Officials in the Legal Metrology Office

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		Used the knowledge gained on the training course to be applied to the verification of weighbridges in Cambodia. Making and submitting report on action plan to PTB as requested.
Mr Harish KANT	Fiji	Evaluate current procedures against information provided on the training course Change testing templates if required as per above action. Use any amended template to test results and send templates to trainers for verification. If approved by trainers then forward to management for approval Training - conduct in-house training on procedural changes; - Conduct refresher training at regular intervals
Mr YUSUF	Indonesia	Share the training information with the Officers in Directorate of Metrology and Learning Centre of Metrology.
Mrs Zhyldyz KARYMSHAKOVA	Kyrgyzstan	Implement new test method using substitution.
Mr Muhammad Fadhil SAHROM	Malaysia	September - December 2017, training with authority body among members from NMI, Ministry and verification Officers. January - April 2018, provide training to Inspectors from the Ministry in Malaysia on the test procedures and method for the Verification of weighbridges.
Mrs Altantsetseg TSERENOIL	Mongolia	Organise training for the Verification Officers, 2 x 20 persons. To organise training for customers (company workers) who use weighbridges (2 days, 30 persons).
Mr Manish Kumar DAS	Nepal	Draft weighbridge test procedures, 1- month. Training to inspectors and Sub inspectors, 2-3 months. Submission of draft procedures to NBSM, 4 months. Send for approval to Ministry (MOI), 5 months. Implementation of Verification guidelines for weighbridges -after approval received.
Mr Bill BOIU	PNG	Revise and update procedure for verification of Weighbridges. In house training for Inspectors located at H/O and regions. Consultation with weighbridge owners and operators on updated procedures. Conduct training for industry and inspectors with support from international and regional experts.

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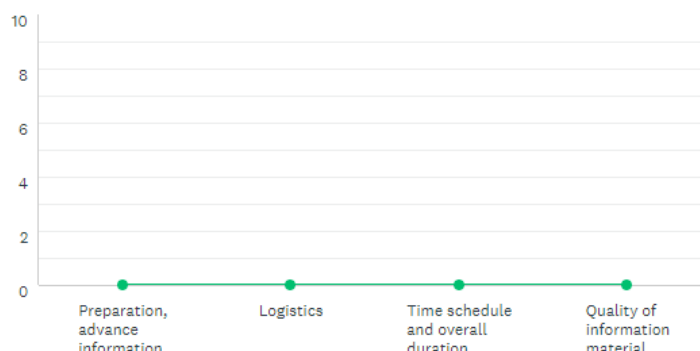
Mr Kiveen SUYCANO	Philippines	Draft practical guide on verification of weighbridges. Conduct a training workshop.
Ms Faith TAN	Singapore	Share the training information with the Officers in the Weights and measures Office of SPRING Singapore. Develop checklist on Verification of weighbridges to assess Accredited verifiers during annual assessment.
Mr Dilruk PATTIYAWELA	Sri Lanka	Prepare a document based on the knowledge and training from the course. Change the existing testing template using the experience gained from the course. Conduct training programs for Inspectors and metrology officers. Conduct training with Weighbridge manufacturers to share the knowledge gained on the course. In our organisation: 2017 December, Sharing the technical knowledge gained from the training course; 2107 December, Sharing the practical knowledge gained from the training course; 2018 January, sharing the knowledge gained from the other economies on the course
Mrs Hanh PHAN THI BICH	Vietnam	Review metrological procedures controlling weighbridges and update according to OIML R76. Train other staff in the procedures to verify weighbridges.

## Annex 5 Participant Feedback

### Workshop on verification of weighbridges in the framework of the MEDEA project from 26-29 September 2017 in Beijing, China

#### Organisation and logistics

Answered: 41 Skipped: 7



	1= PERFECT	2= GOOD	3=AVERAGE	4=POOR	TOTAL	WEIGHTED AVERAGE
Preparation, advance information	65.85% 27	34.15% 14	0.00% 0	0.00% 0	41	0.00
Logistics	48.78% 20	41.46% 17	9.76% 4	0.00% 0	41	0.00
Time schedule and overall duration	60.98% 25	29.27% 12	9.76% 4	0.00% 0	41	0.00
Quality of information material	51.22% 21	43.90% 18	4.88% 2	0.00% 0	41	0.00

[Comments \(11\)](#)

#### Comments:

1. It would be better if PTB is able to add another two or three days to the workshop.
2. From my point of view, it would be better if PTB is able to add another two or three days to the workshop. By doing so, all trainers can have more time to detail all major points of the verification procedure and provide more opportunity for participants to share what they have so far faced in verifying weighbridge in their economy, do exercises and have real practice, otherwise the workshop is sure to produce low outcome.
3. very good
4. I think that the practice's time was too short. We need more practice for weighbridge verification.
5. The training materials are very detailed, and each point of knowledge is involved. The training schedule is very compact and substantial. It's not boring at all.
6. Maybe you can provide more laboratory visits.
7. Maybe, more picture and video about the training is necessary, which could enhance the understanding of OIML R76
8. Process are perfect!
9. I hope can provide on-site inspection opportunities next time, Thank you.

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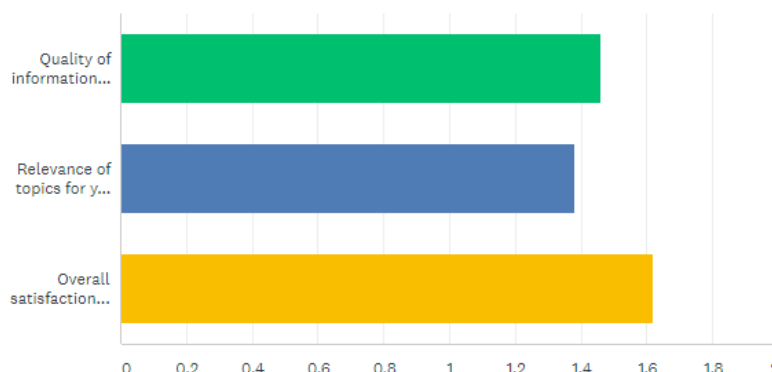
Q3

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## Program and Contents

Answered: 39 Skipped: 9



	1= PERFECT	2= GOOD	3= AVERAGE	4= POOR	TOTAL	WEIGHTED AVERAGE
▼ Quality of information material	56.41% 22	41.03% 16	2.56% 1	0.00% 0	39	1.46
▼ Relevance of topics for your work	61.54% 24	38.46% 15	0.00% 0	0.00% 0	39	1.38
▼ Overall satisfaction of your expectations	51.28% 20	35.90% 14	12.82% 5	0.00% 0	39	1.62

Comments (13)

## Comments:

1. I hope more practice about the training material
2. I have received the information well and the topic was related to my work in Cambodia.
3. Main points of the workshop are related to my work and I received the information about the program well.
4. I enjoy this training very much, it helps me learn a lot on the weighbridge!
5. Practice time was short. We would need more practice time for verification weighbridge.
6. I think that the practice's time was too short. We would need more practice for weighbridge verification.
7. The course has provided me more knowledge about "Instruments with a load receptor having more than four points and more than".
8. The training content is closely related to my current work. It is beyond my expected results, so that I have a new understanding of non-automatic weighing instrument.
9. I suggest that you can support more laboratory visit. And I think this is very useful for us.
10. Maybe you can provide more training and practical operation time, the four days training is too short.
11. Good
12. And work closely related, through this meeting to solve some of the doubts in the work
13. May add more video materials to get a deeper understanding!

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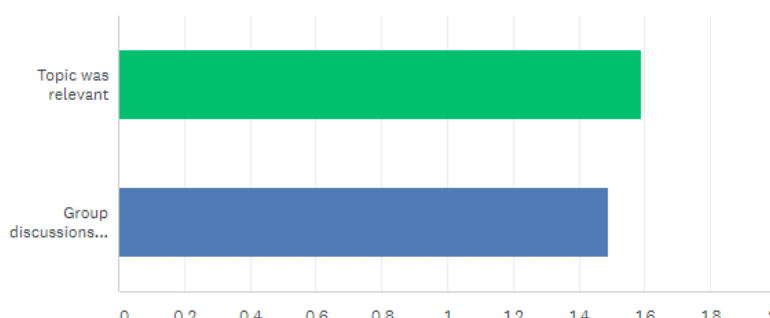
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## Group Work

Answered: 37 Skipped: 11



	1= PERFECT	2= GOOD	3= AVERAGE	4= POOR	(NO LABEL)	TOTAL	WEIGHTED AVERAGE
▼ Topic was relevant Comments (11)	48.65% 18	45.95% 17	2.70% 1	2.70% 1	0.00% 0	37	1.59
▼ Group discussions were helpful to gain a better understanding of the topic Comments (14)	59.46% 22	32.43% 12	8.11% 3	0.00% 0	0.00% 0	37	1.49

## Comments: Topic was relevant:

1. This moment is very interesting because we can know each other
2. Topic was relevant, but the pace of lecturing was a bit fast.
3. The topic was relevant, but the pace of lecturing was a bit fast.
4. We work together to solve the problems, to check what we have learnt, this is really important!
5. The topic corresponds to the work I do, and the weighing test items and measuring methods are my frequent contacts.
6. Thought it might be good if there is an actual demonstration on a weighbridge, and participants can do up the template and actual recording.
7. The discussion if the course is very useful for me.
8. Meterage of electronic car weighing device has been made in great process.
9. Good
10. Through this meeting, both theory and practice have been greatly improved
11. Completely related to my work, it helps a lot

## Comments: Group discussions were helpful to gain a better understanding of the topic

12. Yes, because we can discussion about the material
13. More group work should be provided.
14. More group discussions should be provided to make class session more active.

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15. Of course we can better understand how to calibrate a weigh bridge through group discussions!
16. Should have more actions for groups to practice. It will help us to understand and remember better.
17. Group discussion provides us with opportunities to communicate with each other. We can discuss each other's problems encountered in our daily tests, exchange experience and discuss solutions.
18. More case studies can be provided for calculation and assessments
19. I am very glad to discuss with other trainers and the teachers about the problems during the calibrate for the weighbridges. So I think it is a very good way to me.
20. For the training time is only 4 days, and there may be some questions that we only spend the break time to discuss.
21. You should device participants into some groups to practice in testing scale. It will help us to understand and remember better.
22. Group discussions were helpful to gain a better understanding of the topic
23. Good
24. The group discussion was very active and very enjoyable
25. Arrange more group discussions to deepen understanding!

**What new skills or knowledge have you gained? Was this workshop useful for you and why? How will the information gained during the workshop help you in your work? Please describe as precisely as possible**

### Comments:

1. I can know about substitution method for weighbridge. It will help to teach my student about the training material.
2. How to calculate MPE, how to use substitution weight, how to check zero setting device, how to test eccentricity test by rolling loads. Training course was very helpful for me. I will use for my work all information of the training course.
3. I have gained about how to use OIML R76 for verification, how to choose the test points. The training course was useful because I teach this standard for verification officers.
4. The Substitution Method was very useful for me. Since we do not have adequate standard weights, this method will be very much useful.
5. Since I have worked in weighbridge verification for 3 years, the main points of the workshop were familiar to me. However, many questions I have had were answered by all trainers, and I will use them to supplement any lack in my work.
6. Since I have been working with weighbridge verification for 3 years, the main points delivered in the workshop were familiar to me. However, the workshop is quite useful for me and my economy. Many questions of mine were answered by all trainers and I am to share these answers to my department of legal metrology, so that I can apply them when verifying weighbridge.
7. I gained the substitution method. This workshop is useful for me because I got new idea sharing with other participants. Workshop will help me to understand how to use less standard for testing weighbridge.
8. How to calculate the EPC. how to use substitution to calibrate it is very useful now I know how to judge the scale is passed or not passed.
9. I got the new solution for testing height capacity, e., 80 t, with less standard, 10 t. This workshop is useful for me because it brought new sharing from other countries and training give me a good option. I found new information and more criteria to approve my work.
10. This workshop is very useful for me because I learn some new skills and knowledge different from Chinese verification method. This new knowledge will give me more thought for the verification of Weighbridges.



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11. We have solved so many problems facing in verification of weighbridge.
12. I have more knowledge about scale verifying methods. This workshop is useful for me because it helped me understand more clearly and have overall view about the legal metrology system on Verification of Weighbridges in some country, especial the host country. The information gained during the workshop will help me in inspecting weighbridges manufacturing and exporting companies in Viet Nam;.
13. We have solved so many problems when we are facing in the verification of weighbridges.
14. More information is gained about R76 during this course. The lectures are helpful.
15. the course has provided me selecting load and create standard load when using the Substitution method through specific examples. English Vietnamese I will apply this knowledge to the courageous work of my daily upon return to Viet Nam.
16. Through this training, I finally understood the zero-setting device accuracy, rolling load test, the weight substitution measurement and so on. In the daily automobile weighing field test, the standard weight is often encountered. The quality cannot meet the requirements of the regulation. Through this alternative method, the problem of weight shortage is solved.
17. Better understanding of R76 requirements, concept of verification of weighbridges and NAWI. We will develop a checklist based on the key requirements to assess our authorised verifiers when they are conducting the verification of weighbridges. The information will also be disseminated within the department.
18. New skills: it is very helpful to calibrate weighing instruments with alternative methods; it may save costs in the future calibration of the truck scale; I understand the international recommendations more accurately
19. Through their own learning of professional knowledge and effective internal and external training to obtain professional knowledge; I use knowledge gained to carry out calibration, value transfer, enabling customers to obtain accurate data, get the real situation of the government.
20. I deeply understand the method of the verification of weighbridges. This workshop is useful for me, it helps me to solve many problems about the verification of weighbridges.
21. New skills: it is very helpful to calibrate weighing instruments with alternative methods; it may save costs in the future calibration of the truck scale; I understand the international recommendations more accurately
22. I know more details about the OIML R76, and understand more deeply about the calibration or verification of weighbridges. This workshop is very useful for me, and through the workshop, they help me to solve some questions in my general work. And through the discussion of the teachers and other trainers, I know more details about the weighbridges.
23. Checklist about the R76 and basic concepts of R76
24. I get a new knowledge about substitution method based on OIML R-76. Because we have a different way to use the substitution method. This workshop is useful for me, because I am the person who in charge to change the technical regulation about weighbridges in this year and I'm also the person who will train the inspector to upgrade their knowledge about weighbridge in Indonesia. I think the information is enough for me to help my work. I'm also get a new knowledge about the other country, because we have a same problem in weighbridge and we can share how to solve it.
25. Learn OIML R76 concept of verification of weighbridge and NAWI. This training helps us formulate new draft for weigh bridge verification guidelines for Nepal.
26. Seminars are very useful, especially for rolling load measurements. Rolling load measurement in China's standard there is no relevant introduction, through this seminar experts explained, so that I have a new knowledge of rolling load measurement knowledge.
27. Good
28. Comprehensive understanding of the core content of R76, through learning, but also understand the international R76 terms of the analysis and views, the lack of effective amendments to the work. Through the visit, understand the development trend of weighing instrument, for the future grasp the direction of the study pointed out the way
29. rolling load method



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30. I understand the test method of zero-tracking and rolling load, especially substitution method. All of these can help me in my work

**How will the gained knowledge be used in your institution? How will the gained expertise contribute to your plans of developing the metrological services in your country? Please describe as precisely as possible**

### Comments:

1. I will transfer knowledge with my partner and my student in my country. With training program and in house seminar
2. I will use all information for my work. I think that we need to improve technical capacity
3. I will organize training courses for verification officers of weighing instruments and companies workers which is using weighbridges.
4. NISIT and ICCC will now collaborate and educate our legal metrology officers and the inspectors. Then run several training for our stakeholders with the some support of regional (Asia Pacific) experts.
5. I will share the gained knowledge to my department of legal metrology and discuss with my director to apply what I have learnt in verifying weighbridge in my country. As a result, the owners and users of weighbridge are confident with the verification service and the National Metrology Center of Cambodia is able to enforce Metrology Law effectively.
6. I will share the gained knowledge to my department, so that we can supplement any lack in weighbridge verification as a whole. As a result, both owners and users of weighbridges are confident with our metrological services and the National Metrology Center of Cambodia is able to enforce the Metrology Law effectively.
7. I will use the new knowledge to share my colleagues with a training. Workshop has new criteria as and experiences with substitution method and procedure in testing that I can apply to have good condition with my action plans and service-encourage.
8. In the workshop, I got new experiences from participants and trainers to how to use less standard, 10t, with substitution method. I will bring this point to discuss in my center. I will make an initial plan with the new knowledge to apply my action plan as my application that submit to the training.
9. To calculate if the E meet requirement to check if the test in the plant can reflect the real E
10. We have our own verification basis, JJG 539-2016. I think the new knowledge can help me to give some advice to the verification basis makers.
11. The knowledge we gained from this training share with the all the inspectors and community engaged with weighbridge in our economy.
12. I will use the gained knowledge in giving recommendation for my Director to review some Vietnamese metrological technical procedures related to weighbridges as well as improve the effectiveness of metrological control activities & improve the quality of metrological technical regulations as well as related training;
13. I will try to bring all the knowledge I learnt from the lecture to my colleagues. There is some difference between our regulation and R76, we will try to make the verification methods better than before.
14. I will communicate the knowledge I received at this course for my staff. - I hope when applying Substitution method will help reduce the cost of implementation and increase the accuracy of the weight control for verification of weighbridges
15. I will put the gained knowledge to my colleagues, and use in daily test job. This training let me have further understanding on test method of automatic weighing instruments. We should hold some such academic exchanges. And learn from each other at home and abroad about work experience and working method.
16. We will develop a checklist based on the key requirements to assess our authorised verifiers when they are conducting the verification of weighbridges. The information will also be

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- disseminated within the department and industry players if necessary. The expertise gained provided better insights to our understanding and is necessary in building our technical capability.
17. Through their own learning of professional knowledge and effective internal and external training to obtain professional knowledge; I use knowledge gained to carry out calibration, value transfer, enabling customers to obtain accurate data, get the real situation of the government.
  18. Through their own learning of professional knowledge and effective internal and external training to obtain professional knowledge; I use knowledge gained to carry out calibration, value transfer, enabling customers to obtain accurate data, get the real situation of the government.
  19. I will take a report for my workers in my institution about the gained expertise. And make sure the knowledge that I gained from the training can be taken to my workers in my institution.
  20. New skills: it is very helpful to calibrate weighing instruments with alternative methods; it may save costs in the future calibration of the truck scale; I understand the international recommendations more accurately
  21. I will tell my workers in my institution the details that I learned in this training. And I also want to use the knowledge to discuss the questions with my workers in my institution.
  22. I'm the person who is in charge to change the technical regulation about Non-Automatic Weighing Instrument especially about weighbridge and I'm also the person who will train the inspector to upgrade their knowledge about weighbridge. In this year, we have a target to revise our technical regulation about Non-Automatic Weighing Instrument especially for weighbridge. And every year, we also do the training about weighbridge to upgrade the inspector knowledge. We do twice in one year.
  23. We have around 500 weighbridges in Nepal. So this training helps us implement OIML R76 to implement for verification of weigh bridge in Nepal.
  24. Electronic truck scale measurement work is still imperfect, through this learning exchange activities, especially the new knowledge of rolling load measurement will be applied in the future weighing instrument measurement work.
  25. Good
  26. After I returned to the unit, I made technical exchanges with the new understanding, and guided the organization to integrate with the international standards
  27. I will propagate and implement the instruction to my institution. The gained expertise make a better understanding of R76 and have great maneuverability.
  28. I write a training report and will train my colleges
  29. I think the gained knowledge will enhance the testing level of our institute, I will bring the knowledge to my colleges

**Are any follow-up measures after the training planned or needed to support and ensure that the training content is used and implemented at your institution? Please describe as precisely as possible**

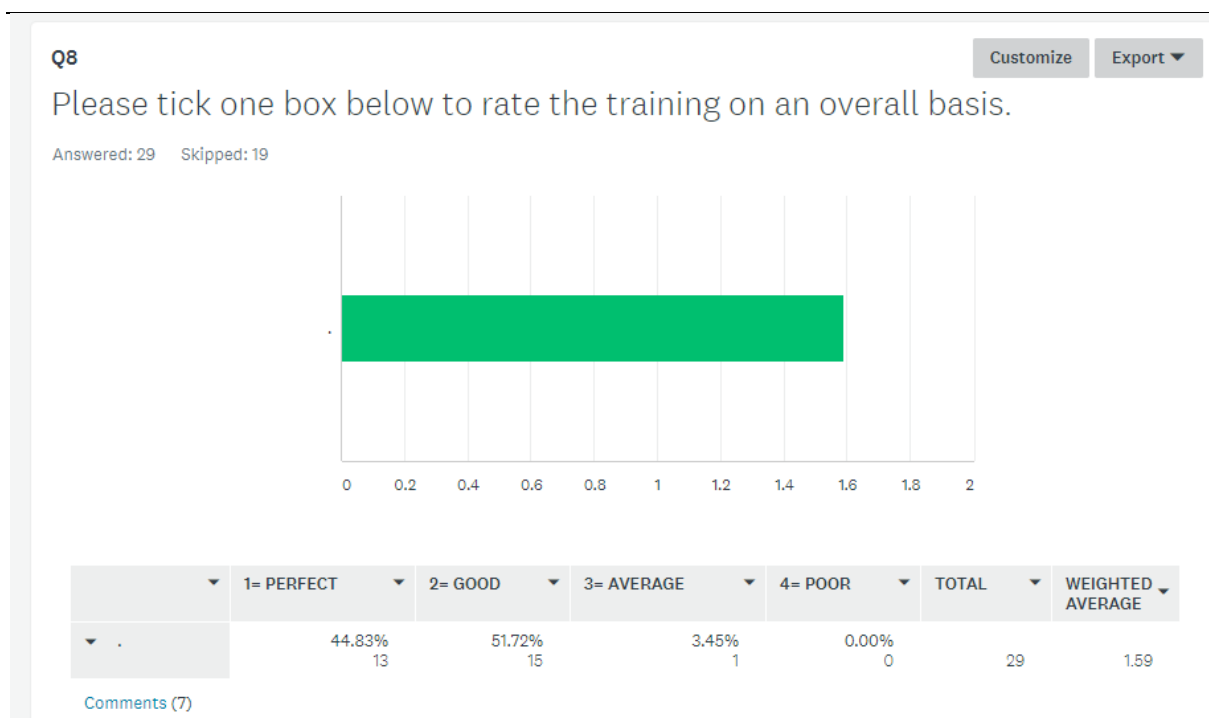
### Comments:

1. Aa
2. Yes
3. On-site training need for us.
4. 2 days training will be planned for one company's 35 workers in November. I think that we need onsite training for weighbridges verification. And weighbridge software training need for us.
5. Yes, we will be requiring support for technical assistance and also we would require assistance to establish our weighbridge station.

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6. I will submit report to my workplace, conduct training on weighbridge verification in my department, and apply what I have learnt in my real work. Importantly, I will send report of my action plan to PTB as requested.
7. I will submit report of the training to my director of department, president of National Metrology Center and Senior Minister of Ministry of Industry and Handicraft. Importantly, training will be conducted by me to the department and all techniques learnt will be applied in my work of weighbridge verification. Last but not least, I will send report of my action plan to PTB as requested.
8. Preparing documents and training to my colleagues.
9. To give the manufacturing team training on how the E is tested.
10. Yes, we need to do some measures after the training to compare the new methods with the old ones.
11. yes, It can be used to improve our testing procedures.
12. Yes
13. Yes
14. Lecture notes and slides will be helpful.
15. I will make a report of the training content to the department head, and prepare a training on the truck scale test according to the prior training plan.
16. We will develop a checklist based on the key requirements to assess our authorised verifiers when they are conducting the verification of weighbridges. The information will also be disseminated within the department and industry players if necessary. The expertise gained provided better insights to our understanding and is necessary in building our technical capability.
17. After training, the professional knowledge will be put into practice, and other people will be trained to transfer professional knowledge
18. Through their own learning of professional knowledge and effective internal and external training to obtain professional knowledge; I use knowledge gained to carry out calibration, value transfer, enabling customers to obtain accurate data, get the real situation of the government.
19. I will take a summary about the training, and sent it to my workers at my institution. And solve their questions about the OIML R76.
20. New skills: it is very helpful to calibrate weighing instruments with alternative methods; it may save costs in the future calibration of the truck scale; I understand the international recommendations more accurately
21. I will take a training summarize for my institution, and make sure the training content is used and implemented at my institution.
22. Yes
23. Yes, we have. Because it has been our program in my institution in this year and next year, and also for the other institution (ex: ministry that have weighbridge for safety, local government that have to verify, and industry). Because the weighbridge policy become urgent in this year and next year.
24. Yes we need further assistance to implementing OIML R76 for verify weigh bridge in Nepal. This training is starting point.
25. In the training program, if more practical training can be provided, the content of this training will be more deeply understood and mastered
26. The relevant personnel of my unit are trained, and the inspector is corrected in accordance with the training content at work.
27. Substitution of standard weights at verification will be used at my institution!
28. I write a training report and will train my colleges
29. I will write a training report and train my colleges

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### Comments:

1. Provided information, flight, accommodation, training venue, qualified trainers, active organizers, laboratory visit, demonstration at visited company, food, and friendly participants really made the workshop complete.
2. very good training
3. I have gained a lot from the training.
4. Pace of the lessons can go a bit slower. Materials can include more case studies for practice on application.
5. The training is very well, and I hope there will be more trainings like this.
6. The trainer added some video materials to make better understanding of the teaching materials! This is very useful!

### What was the most effective part of the training? Please describe as precisely as possible

#### Comments:

1. Group discussion and dinner together because this part can make closed each other
2. Pattern approval testing lab
3. The most effective part of the training were pattern approval testing lab, making a weighbridge test plan, group work.
4. The Most Effective Part of the Training is when a video on change-over was presented
5. The most effective part of the training was group discussion.
6. The most effective part of the training was group discussion.
7. Group discuss and explaining from trainers and participants.
8. There is doc who show us how to operate, so we can understand what the lessons are. how we operate to test the E, the repeatability, the substitution
9. Trainer give us actual operation for each knowledge point. This workshop provided an opportunity for communication.
10. Proposed substitute method

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11. Weighing Test using Substitution Material, Calculating the actual weight of the substitution load
12. Illustrative examples
13. The training that I gained most is the following: zero accuracy, rolling load test and substitution method. I changed the previous testing methods of these items misunderstanding.
14. Examples showing are really effective. It is more practical.
15. Tea breaks, where participants get to come together to discuss and clarify their doubts.
16. The most effective link is to visit and study in China Institute of Metrology and to visit the WAN Ji.
17. The discussion with the teachers and other trainers.
18. New skills: it is very helpful to calibrate weighing instruments with alternative methods; it may save costs in the future calibration of the truck scale; I understand the international recommendations more accurately
19. The discussion between the teachers and other trainers.
20. operation training
21. Training in the class and discussion with the trainer about our problem when we verify the weighbridge.
22. Field visit and practical example
23. The most effective part of the training is the specific demonstration process of the relevant provisions of R76.
24. The video and practical demonstration are arrange in the training is very effective part of the training.
25. I engage in technical exchanges with relevant practitioners, familiar with the international trends in technology development
26. Explanation of Substitution method
27. Explanation of Substitution method

### How could the training course be improved? Please describe as precisely as possible

#### Comments:

1. At the first session, I think it needs ice breaking to know each other. More practice
2. To extend practice time
3. Need to increase practical time.
4. More practical examples and practical explanations.
5. The training course could be improved as the following: - Time, discussions, exercises and practice should be added. - Trainer talking time and participant talking time should be equal. - Trainers should make their English clearer to all non-native participants. - Pace of lecturing should be slower. - Trainers should try in any ways to make participants ask, otherwise ask them back to check their understanding.
6. The training course could be improved as the following: - Time, discussions, exercises and practices should be added. - Pace of lecturing should be slower than this. - Trainers should make their English clearer to all non-native participants so that they are able to catch up with what trainers meant and ask more questions. - Trainers need to make participants ask, otherwise ask them back, so that training become more active. - Trainers Talking Time and Participants Talking Time should be equal.
7. Summarise the lesson and explain the role of each step by step to make it clear for some new participants.
8. Longer session would be preferred we had a lot jobs to deal with after training in the daytime.
9. I hope every trainee can has the opportunity to practice verification operation. So maybe the organizer can prepare more instruments next time.
10. 1 Regulation of weighbridge contraction parameter 2.How to minimized testing time 3. Perfect testing procedure template. 4. How to choose load cell capacity, type of load cell for given specification of weighbridge.
11. The training course should have more practice and group discussion.
12. Should practice more

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13. We can give some examples of field test of truck scale, and collect some problems encountered in the verification process. Let the students discuss, and finally give the correct treatment method.
14. NIL
15. More details and case study for application - demo on actual weighbridge if possible
16. There must be bilingual translation
17. I hope that everyone can have the chance to actual operation.
18. New skills: it is very helpful to calibrate weighing instruments with alternative methods; it may save costs in the future calibration of the truck scale; I understand the international recommendations more accurately
19. I hope the training time maybe extend for two weeks.
20. NAWI has more types and structure, like electric scale and weighbridge. It is difference to verify scale and weighbridge, especially the max capacity of weighbridge of 100t or 200t. The vehicle is limited by the weights, about 50t for 5 axles vehicle, and only 20t standard weights is transported, so it is not easy to verify to max capacity. Considering the substitution materials, it is not easy to find the suitable materials to equal standards weights. so something should be discuss in different countries, what is the situation, and how to verify
21. More time for discussion after the training
22. More time for discussion after the training
23. More demo and a complete realistic in field verification of weigh bridge.
24. If you can add more students in the later training courses, the actual operation of the training process, students better grasp the content of the training will be very helpful.
25. Rich content of teaching video and practical operation!
26. It's very good
27. Add more on-site training
28. Add on-site training



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## Photographs – Annex 6



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