REPORT FOR TRAINING COURSE ON TRAIN THE TRAINER COURSE ON THE VERIFICATION OF BULK FLOWMETERING SYSTEMS USING A MASTER METER

Dates: 24-27 July 2017

Venue: Pullman Pattaya Hotel G & Central Bureau of Weights and Measures, Chon Buri.

Host: Central Bureau of Weights and Measures, Thailand

Trainers: Marian Haire, NMIA

Brad Larter, NMIA

Pisakorn Pisankul, Central Bureau of Weights and Measures, Thailand

Surachai Sungzikaw, Central Bureau of Weights and Measures, Thailand

1. Objective of the Training

Accurate measurement in the marketplace is an important component of an economy's metrological system. APLMF has conducted training courses for the past 20 years to support the development of a sound measurement infrastructure that inspires confidence and trust within the region. This ensures both consumers and vendors are

benefitting equally and promotes fairer trade with greater transparency, accuracy and long-term sustainability. Due to the high monetary value of fuel bought, sold and transferred through metering systems, it is vitally important that legal metrology authorities use harmonised verification test procedures.

This course provides participants with the knowledge and skills to:

- understand the role of trade measurement within an economy
- identify the major components of a bulk flowmetering system
- analyse the operating environment to determine how it could impact on the performance of the meter
- identify sources of any possible operational error
- verify a bulk flowmetering system in accordance with the test procedures and workplace health and safety guidelines
- train others to verify bulk flowmetering systems

2. Target Group

This train-the trainer course is designed for staff who have a responsibility to train staff in their own economies. It is designed for people who verify bulk flowmetering systems or who have a responsibility for ensuring that these instruments are verified in accordance with OIML recommendations. In addition to some training experience all participants are expected to have practical experience in the field using a master meter or a prover. In choosing participants for this course we recognised that some economies were only starting to consider how they would regulate bulk flowmetering systems. As a result some participants had minimal expereince but would be involved in developing systems in the future.

3. Description of the Training Course

This training is composed of lectures and practical activities. The lectures cover a basic understanding of the test procedures required to verify bulk flowmetering systems using a master meter and a volume measure as the reference standards. The practical component demonstrates the test procedures and explain how the reference standard is verified.

On Day 1 each economy presented a short presentation outlining how they manage the verification of these systems in their own economy. This allowed us to develop a summary of how these instruments are verified within the economies represented at the training. This Summary of Economy Reports is found in Annex 3 and identifies economies who are yet to include regulations for bulk flowmeters in their economies. In the afternoon of Day 1 we visited the Eastern Weights and Measures Center at Chon Buri where we inspected the bulk flowmetering system test rig we would use for practical demonstration later in the program. Day 1 culminated in a very nice welcome dinner hosted by the Department of Internal Affairs. It was held outdoors, under shelter,

at a local restaurant which was good as there was a very heavy downpour of rain during the meal which added to the excitement we were all experiencing.

Day 2 – The trainer started the course by explaining how the verification of these systems are managed in Australia. It was noticed that several economies use various reference temperatures which relate to variations in their local environments. Reference temperatures varied from 15°C to 30°C. The equipment used to verify bulk flow systems was explained ensuring participants knew the advantages of using a prover, a master meter or the gravimetric method. The course focused on test procedures for volumetric methods. The accuracy and related uncertainties were explained so appropriate decisions would be made when choosing the best equipment for each verification. The importance of applying the relevant corrections shown on certificates of verification for provers, master meters and thermometers was explained. Interpolation was used to enable participants to apply corrections when they fall between numbers shown on the certificates of verifiation. The meter factor is also applied to take into account the viscosity and flowrate of the product being tested. Pressure conversion factors are also used to take into account the density of the product. The trainer pointed out there is a simple method shown in the test procedures for making this calculation.

Day 3 – Participants were divided into 4 groups. Two groups at a time were invited to observe the test rig while in operation. A prover was used to verify the master meter which in turn was used to verify the meter under test. Participants collected results and then applied the relevant corrections to determine if the meter under test was performing within the maximum permissible errors. While the first two groups were observing the demonstration the last two groups were answering some test questions. The groups swapped over so everyone had the same experience. Towards the end of the day each groups was allowed to spend time preparing for their presentations on Day 4. The final step of Day 3 was to ask each participant to commit to implementing their action plan upon their return to their economy. A Summary of Action Plans is available in Annex 4.

Day 4 – Each group made their presentation showing they understood the test procedures and would be capable of training others later. All participants were asked to provide groups with feedback on the effectivenes of their presentation. They choose to evaluate each other on team work, content, presentation method and preparation. Annex 5 contains a list of groups members and topics.

The farewell dinner was held at the Pullman G Hotel in South Pattaya where the delegates were staying. We experienced a beautiful Pattaya sunset, good food and happy memories. M Haire thanked everyone on behalf of APLMF and acknowledged the work of the host economy and the financial support from PTB. The support provided by Sakchai Hasamin during his role as APLMF representative for Thailand was also acknowledged. We wished him well in his retirement which starts in September.

4. Highlights/ Lessons Learned

The objectives on the training were met and the participants were very keen to learn as much as possible. They all expressed a willingness to go back to their economies and work within their constraints to improve systems for regulating bulk flowmeters.

What was the feedback of the participants?
The participants acknowledged the following highlights of the course:

- Practical sessions provided a better understanding of the test procedures.
- Working together with people from other economies
- Working together in groups provided good opportunities for discussion and interaction
- Provided a good opportunity to get to know people from other economies
- Practical training and interaction with others during delivery of training sessions
- The training provided a good opportunity to have a better understanding of the roles of people from other economies.

One suggestion was to reduce time spent on economy reports and replace it with Q&A by trainer so they can gather enough information to understand their audience. Participants could be asked to complete information in the table before the training courses and this could be used to stimulate initial discussions.

Trainers need to consider how they will deliver learning activities when the participants have no hard copy materials. Learning activities may need to be saved as separate documents so they can be easily accessed. Using Google docs is working well.

A copy of the feedback provided by participants is found at Annex 6.

5. Next Steps/ Follow-up

Participants committed to their action plans and APLMF Secretariat is also committed to following up these plans with participants at regular intervals.

Annex 1: Workshop Program

Train the Trainer Course on the Verification of Bulk Fuel Systems using a Master Meter

Monday 24 July Venue: Pullman Pattaya Hotel G

Time	Details	Presenter
08:30 – 09:00	Registration	Host
09:00 – 09:40	Welcoming address from the host economy Opening ceremony (APLMF Secretariat) Group photo taking	APLMF and Host
09:40 – 10:00	Introduction	APLMF and Host
10:00 – 10:45	Overview of the course Economy reports - explains how bulk flowmetering systems are verified	Marian Haire Trainees
10:45 – 11:15	***Coffee Break***	
11:15 – 12:30	Economy reports continue	Marian Haire Trainees
12:30 – 14:00	Lunch break	
14:00 – 15:30	Brief visit to view bulk flowmetering system Equipment required for testing Safety considerations Visual inspection	Surachai Sungzikaw, Pisakorn Pisankul Brad Larter
15:30 – 16:00	Coffee break	
16:00 – 17:00	Test procedures for bulk flowmetering systems	Brad Larter
18:00 – 20:00	Welcome dinner hosted by DIT	

Tuesday 25 July Venue: Eastern Weights and Measures Center

Time	Details	Presenter
9:00 – 10:30	Test procedures for bulk flowmetering systems	Brad Larter
10:30 – 11:00	***Coffee Break***	
11:00 – 12:30	Test procedures for bulk flowmetering systems	Brad Larter
12:30 – 14:00	***Lunch***	
14:00 – 15:30	Test procedures for bulk flowmetering systems	Brad Larter

15:30 – 16:00	***Coffee Break***	
16:00 – 17:00	Demonstration of test procedures and completion of test report Question and Answer session	Surachai Sungzikaw, Pisakorn Pisankul

Wednesday 26 July **Venue: Eastern Weights and Measures Center**

Time	Details	Presenter
9:00 – 10:30	Demonstration of test procedures and completion of test report	Surachai Sungzikaw, Pisakorn Pisankul
10:30 – 11:00	***Coffee Break***	
11:00 – 12:30	Students work together to answer test questions	All trainers
12:30 – 14:00	***Lunch***	
14:00 – 15:30	Group discussion of answers to test questions	Brad Larter Marian Haire
15:30 – 16:00	***Coffee Break***	
16:00 – 17:00	Preparation for group presentations Action plans	All trainers

Thursday 27 July **Venue: Eastern Weights and Measures Center**

Time	Details	Presenter
9:00 – 10:30	Group 1 presentations – Discussion and feedback	Participants
10:30 – 11:00	***Coffee Break***	
11:00 – 12:30	Group 2 presentations – Discussion and feedback	Participants
12:30 – 13:30	***Lunch***	
13:30 – 15:00	Group 3 presentations – Discussion and feedback	Participants
15:00 – 15:30	***Coffee Break***	
15:30 – 17:00	Group 4 presentations – Discussion and feedback	Participants
17:00 – 17:30	Closing Ceremony	APLMF and Host
18:00 – 20:00	Farewell dinner hosted by MEDEA	

Annex 2: List of Participants

Name	Economy	Institution
Mrs. Leki Choden	Bhutan	BSB
Mrs. Tashi Youden	Bhutan	BSB
Mr. Kong SOK	Cambodia	NMC
Mr. Vann CHANNRAT	Cambodia	Ministry of Industry and Handicraft
Mr. Jintao FANG	China	National Station of Petroleum + Natural Gas Flow Measurement.
Mr. Jitendra LAL	Fiji	Ministry of Industry, Trade and Tourism
Mr. Joeli D. KINI	Fiji	Ministry of Industry Trade, and Tourism
Mr. Iyus RUSLAN	Indonesia	Ministry of Trade
Mrs. Yusniati TRIVANI	Indonesia	Kementerian Perdagangan
Mr. Hafidzi HAMDAN	Malaysia	NMIM
Mr. Mod Noor MOHD GHAFAR	Malaysia	NMIM
Ms. Badamkhand DAVAASAMBUU	Mongolia	MASM
Ms. Sergelen NOKHOIJAV	Mongolia	MASM
Mr. Santosh Sharma	Nepal	Bureau of Standards and Metrology
Ms. Patra Korana	Nepal	Bureau of Standards and Metrology
Mr. Sylvester VOVOVON	Papua New Guinea	NISIT
Mr. Jose Macrolides	Philippines	Industrial Technology Development Institute
Mr. Yong Seng Lim	Singapore	SPRING Singapore
Mr. Nonpork Hoopoe	Thailand	CBWM
Mrs. Wipawee Namangan	Thailand	CBWM
Mr. Bach CAO VIET	Vietnam	STAMEQ

Mr. Quang CHU MANH	Vietnam	Quality Assurance and Testing Censer 1

Annex 3 Summary of Economy Reports

Summary of Economy Reports

MEDEA Project APLMF #1: Course on Train the Trainer Course on Verification of Bulk Fuel Systems Using Master Meter Held in Pattaya City, Thailand the course took place 24-27 July 2017

Economy	Legislation	SI	MPE used	Inspector of 3rd pty	Verification periods	OIML compliant	Type approval	Issues	Other
Bhutan	Bulk flowmetering systems are not controlled	Yes	N/A	N/A	N/A	N/A	N/A	Lack of resources, testing facilities and suitably qualified and trained staff.	
Cambodia	Legislation, but bulk flowmeters are not currently regulated	Yes	N/A	N/A	N/A	N/A	N/A	Need law and technical experts. Financial support to buy equipment	
China	Legislation	Yes.	±0.15% for master meters. 0.5% for flowmeters	Inspectors	Annual	Yes	AQSIQ is responsible for type approval		

Summary of Economy Reports

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Economy	Legislation	SI	MPE used	Inspector of 3rd pty	Verification periods	OIML compliant	Type approval	Issues	Other
Fiji	Legislation	Yes	±0.3%	Inspectors	Annual	Yes. Master meter is traceable certified annually in Australia.	Rely on Australia's pattern approval system	Lack of specialised staff and training. Economic constraints. Lack of infrastructure.	Looking to implement Quality Management System. Need to review legislation.
Indonesia	Legislation	Yes	±0.2% for master meters. ±0.5% for flowmeters	Inspectors	Annual	Yes. OIML requirement adopted for initial and subsequent verification	Completed by Directorate of Metrology	Lack of human resources and suitable test facilities	
Malaysia	Legislation	Yes	±0.1%	Inspector / Verifier	Annual	Yes	Yes. Certificates of Approval are valid for 10 years.	MDTCC lacks awareness re legal metrology system, so requirements are not fully enforced as some meters are not pattern approved.	NMIM is under different ministry which can cause misunderstandings.

Summary of Economy Reports

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Economy	Legislation	SI	MPE used	Inspector of 3rd pty	Verification periods	OIML compliant	Type approval	Issues	Other
Mongolia	Legislation	Yes	±0.3%A	Verification officers	Annual	Yes	Yes. Valid 3-10 years	Lack of qualified human resources. No suitable calibration facilities. Low funding. Lack of technical infrastructure.	
Nepal	Yes	Yes	±0.1%	Inspectors	Annual where applicable	Not OIML. Further development is required	No	Low demand. Lack of specialised staff and resources. No procedures for verification using master meters	
Papua NG	No	Yes	±0.15%	No inspection	Annual	Yes. Australian test procedures have been adopted	No	Conflicting legal responsibilities with ICCC. Lack of specialised staff and resources.	ICCC and NISIT need to work cooperatively

Summary of Economy Reports

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Economy	Legislation	SI	MPE used	Inspector of 3rd pty	Verification periods	OIML compliant	Type approval	Issues	Other
Philippines	No legislation	Yes	Maintained by oil companies. Some oil companies apply international standards	N/A	N/A	N/A	N/A	Need to make government aware of the importance of regulating bulk flowmeters	
Singapore	Legislation	Yes	±0.2%	Authorised verifiers (AVs) conduct verifications. Meters are sealed by SPRING or AVs	Recommend annual verification depending on the application	Yes. However, AVs use API as reference for the verification of meters rather than OIML	Yes. Manufacturer's responsibility.	Limited capability of AVs. (Mass flowmeters are used for bunker fuel transfers up to 1100 t/h). Some problems with traceability of reference standard calibrations.	

Summary of Economy Reports

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Economy	Legislation	SI	MPE used	Inspector of 3rd pty	Verification periods	OIML compliant	Type approval	Issues	Other
Thailand	Legislation	Yes	±0.5% for accuracy class 0.5. Repeatability 0.2%. (Practical operation 0.05%).	Inspectors	regulation is 2 years but in practice is done every 6 months	Yes, with some limitations	Yes	Insufficient number of trained inspectors to enforce regulations. Some regulation requires amendment to reflect current technology.	More training required to ensure staff have specialised expertise.

Summary of Economy Reports

MEDEA Project APLMF #1: Course on Train the Trainer Course on Verification of Bulk Fuel Systems Using Master Meter Held in Pattaya City, Thailand the course took place 24-27 July 2017

Economy	Legislation	SI	MPE used	Inspector of 3rd pty	Verification periods	OIML compliant	Type approval	Issues	Other
Vietnam	Legislation	Yes	±0.3%	Verification officers	Depends on the instrument 'Group'. Group 2 instruments must be verified annually	Depends on the instrument 'Group'. Bulk flowmeters are compatible with OIML requirements	'Group 2' instruments (60 types of instruments) have a mandatory requirement for type approval/pattern compliance and verification. type approval valid 10 years.	Insufficient number of verification officers to conduct verifications. High cost of maintaining and calibrating standards and master meters. Problems controlling effects of temperature during trade verifications.	

Annex 4: Summary of Action Plans

Summary of Action Plans

Verification of Bulk Fuel Systems Using Master Meter, Pattaya City, Thailand – 24-27 July 2017

Title	Surname	First Name	Economy	Action Plans
Mrs	CHODEN	Leki	Bhutan	Share knowledge learnt during training with colleagues and management.
Mrs	YOUDEN	Tashi	Bhutan	Support colleague to share knowledge learnt during training with colleagues and management.
Mr	CHANNRAT	Vann	Cambodia	I will provide a report to Director detailing the outcomes of the training. Translate training materials into Cambodian language.
Mr	SOK	Kong	Cambodia	Train staff in Cambodia.
Mr	FANG	Jintao	China	I will share my knowledge with colleagues in China.
Mr	KINI	Joeli D.	Fiji	We can share our knowledge with the Oil Companies when we conduct verifications of bulk flowmeters.
Mr	LAL	Jitendra	Fiji	Firstly, we need the support of a Director who can understand the challenges of our current situation. We will provide in-house training for officers at the Divisional Level and in the future, we will implement additional training.
Mr	RUSLAN	Iyus	Indonesia	After we have completed this training course we will compare the training material with the Indonesian documents to confirm whether we have any differences. We will make improvements to our regulations regarding flowmeter verification.
Mrs	TRIVANI	Yusniati	Indonesia	I will support my colleague
Mr	HAMDAN	Halfidzi	Malaysia	I will plan to meet with authorised verifiers and share the knowledge we have learnt to verify the authorised verifiers are applying the correct procedures
Mr	MOHD GHAFAR	Mohd Noor	Malaysia	We will meet with our Ministry representatives and discuss what we have learnt. In the future we will be training staff from the Metrology department.

Summary of Action Plans

Ms	DAVAASAMBUU	Badamkhand	Mongolia	After this training course, we will inform our organisation about this training and schedule a training project on this topic.
Ms	NOKHOIJAV	Sergelen	Mongolia	I will support my colleague in these actions.
Ms	KOIRALA	Pabitra	Nepal	I will share the training materials with my colleagues in my country. In one and a half years we may have the test procedures for testing bulk flowmeters, then we will put training in place
Mr	SHARMA	Santosh	Nepal	I will support my colleague in these actions.
Mr	VOVOVON	Sylvester	Papua NG	We are going to draft a procedure for the calibration and verification of bulk flowmeters by mid-November 2017. I will coordinate inhouse training in my country on the requirements of verifying bulk flowmeters We will provide training to the regulator ACCC and the fuel industry in the mid 2018.
Mr	MARCO LATOSA	Jose	Philippines	The main issue in the Philippines is the lack of regulation. I will make our regulators and policy makers aware of the importance of regulating bulk flowmeters in accordance with international requirements. I will coordinate meetings and training on the requirements of verifying bulk flowmeters.
Mr	LIM	Yong Seng	Singapore	I will share this knowledge with my colleagues and the authorised verifiers eo enure OIML compliance.
Mr	CHOOPOL	Nopporn	Thailand	My colleagues and I will thoroughly study the training materials. We may adapt some additional tests in the Thai test procedures to reflect the Australian NITP.
Mrs	NAMAGORN	Wipawee	Thailand	I will revise the documents again. I will share my knowledge with other officers in Thailand, as some areas in Thailand do not have knowledge about the verification of bulk flowmeters.
Mr	CAO VIET	Bach	Vietnam	We will share this knowledge with technical staff and compare this material with our current regulations. If there is any significant modification, we will propose some of these changes in 2017. If the Director General approves, we will add these changes to our regulations in the future.
Mr	CHU MANH	Quang	Vietnam	I have plans to buy a prover next year so we are able to conduct verifications on site. The temperature varies in Vietnam, so I need to put procedures in place for allowing for these temperature changes.

Annex 5: Group Member and Topics

Groups	Members	Topic for Day 5 presentation
Group 1	Hafidzi HAMDAN Jitendra LAL Bach CAO VIET Jintao FANG Nopporn Choopol Santosh Sharma	Equipment required for testing Preparation for testing Reference standards Visual Inspection Questions to ask audience
Group 2	Badamkhand DAVAASAMBU Joeli D. KINI Quang CHU MANH Mohd Noor MOHD GHAFAR Wipawee Namagorn Pabitra Koirala	Indicating device Zero setting Non-return valve Maximum flowrate Meter creep Questions to ask audience
Group 3	Sergelen NOKHOIJAV Kong SOK Iyus RUSLAN Leki Choden Jose Marco Latosa	Accuracy test – using a prover Questions to ask audience
Group 4	Sylvester VOVOVON Vann CHANNRAT Yusniati TRIVANI Tashi Youden Yong Seng Lim	Accuracy test – using a master meter Questions to ask audience

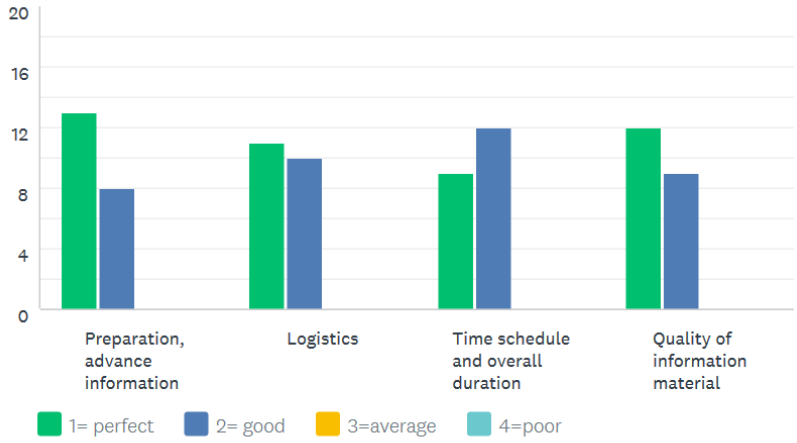
Annex 6: Feedback

Train-the-Trainer Course on the Verification of Bulk Flowmetering Systems using a Master Meter in the framework of the MEDEA project

from 24-27 July 2017 in Pattaya, Thailand.

Organisation and logistics

Answered: 21 Skipped: 1

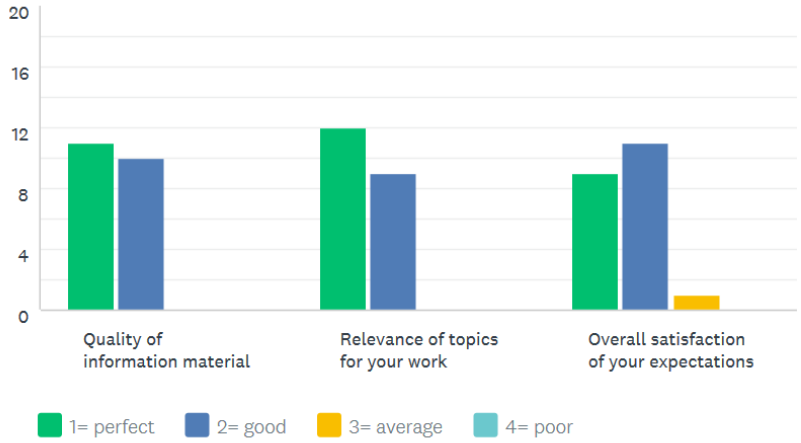


Comments:

1. Organization and Logistic was perfect
2. A good training course that needs more time to be conducted.
3. Maybe additional time scheduled for visiting local tourist sites or assistance with information for sightseeing.
4. Although the course duration was short, the course was very informative and helpful as i do not have this experience.

Program and Contents

Answered: 21 Skipped: 1

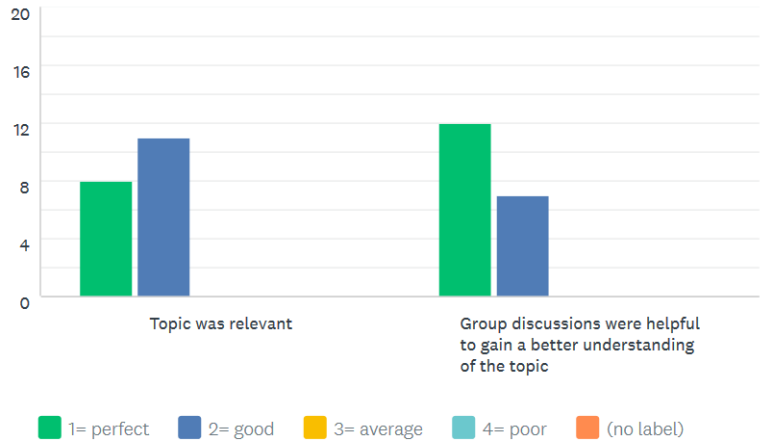


Comments:

1. Program and Content was perfect.
2. May be instead of covering so much material. We need more focus on significant factors that affect errors and practical knowledge on these factors.
3. Error calculation and class exercise together with practical sessions was very useful tool to understand the concept. A well presented training layout by both Trainners.
4. This course has many topics about procedure of testing but we have limited time then trainer had to speed up the contents. I think we should increase 1 more day for the lecture in class so the trainer can have more time for explaining detail of each test.

Group Work

Answered: 19 Skipped: 3



Comments: Topic was relevant:

1. Participant was divided into groups for group work and relevant topics for discussion
2. Language barrier

3. The topic for group discussion should have given a theme / situation, maybe one problem for each group to solve
4. The task given were unclear/overlapping !! Another method should have been chosen

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

1. Presentation on all the groups on the Volumetric Measure
2. Exactly, but language was the problem
3. Should have been more discussion and short presentation, that way everybody can participate more frequent
4. Maybe for group exercise, each group also need to present their work to the class
5. Very useful as when we did group discussions and later explained by the trainer and solved the activities
6. Better if all participants are required to contribute to their group presentation instead of just a selected few.

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. Through the training course, I have learned using tank measure to verification flow meter and using master meter to carry out the flow meter calibration process, the matters needing attention, the data evaluation, etc., through the practice operation and group presentation to further consolidate the learning outcomes. In addition, about the classification of the measuring instruments management identification, vehicle distribution, and measurement of performance evaluation for our flow meter performance evaluation work has the very good reference value.
2. At the work shop, I learned about the Bulk flow metering and it was a work of increasing the metrology and Cambodia's economy.
3. In Fiji we rely on NMI Australia thanks for the training as I now understand the work to be carried out better
4. I have gained the skills and knowledge of how to carry out the full verification procedure of a bulk flowmetering system. This training was the missing piece that we needed in our economy.
5. Procedure with practical for the verification of bulk flowmeter using master meter. The workshop was good and useful as we are going to do in our economy and the information gained will help us to make procedure and work in the field easily
6. Other Economy regulations.
7. We have learned how to use the correct procedure to calculate the percentage error and flow rate calculations. We can cross check the repairer’s readings obtained, to verify if it is correct.
8. Environmental factors and equipment considerations that affect verification accuracy.

9. Learned the correct method for calculating the percentage error. It was very useful because the in training we learned how the traceability of master meter is linked to the standard prover tank which is traceable to the weighing instrument where the prover is mounted on and finally the standard mass F1 used for its certification. And this will allow our economy to verify our standards in between to maintain its accuracy.
10. At this workshop, I learned about the Bulk flow meter and it was important for Cambodia in the future, as it was a work of increasing the metrology and Cambodia's economy.
11. 1. I learned international best practices for bulk flow meter calibration. 2. I observed how it is done here in Thailand. 3. I discussed the practices in other ASEAN countries. 4. I can now develop procedures and recommend on what instruments are needed to calibrate/verify bulk flow meters. 5. My role in my organization is to plan and research on new fields of metrology which are not implemented in my country. I would now focus to convince my top management that this is the method we should adopt, this is the amendment that should be made in our law. Etc.
12. This kind of workshop was very useful for enabling us to develop the action plan and have enough ideas on being a good verifier.
13. The information presented is highly structured and based on standard recommendations, because it uses easy-to-understand methods or methods the easy way, and is very helpful in doing the work as well as procedures and quick calculation
14. From this course, I have learnt many tests of the verification of bulk flow metering system, and l will discuss to my colleagues about the test that is useful and we may adapt some tests to our own system as the additional tests.
15. From the workshop, I have learned the basic principle in verifying bulk flowmeters. Deeper understanding of the procedure can be gained through reading and studying the training materials provided. I have also learned the calculations needed in verifying flowmeters. The workshop was very informative. Since one of the role of our institute is to provide continual training resource on Metrology, the workshop on verifying bulk flowmeter is a big help for our country in providing knowledge in verifying flowmeters to regulators. Although, there is still no regulation for bulk flowmeter in the Philippines, this workshop could help us made our policy maker and regulator to craft relevant regulations with regards to bulk flowmeters.
16. About the bulk flowmetering system in Cambodia still don't have yet so it is our first time to know and get some knowledges from this field by this training. It is very, very useful for us and the economy. It can be a part of our developing country if we achieve it and also can be increasing our national income from providing service on verification or calibration to the customers. All the information gained during the workshop can help us a lot by making us as opportunities to become new and young leader of our group, office or department by sharing, training and providing efficiency services to the customer.
17. Since Bhutan imports lots of petrol and diesel, this information will help us work in ensuring that the we get exact quantity of petrol and diesel.
18. Useful guide and reference to reinforce the steps and requirements. Enable us to assess our designated Authorised Verifiers on their resources and procedures on verification of flowmeters using master meters.

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

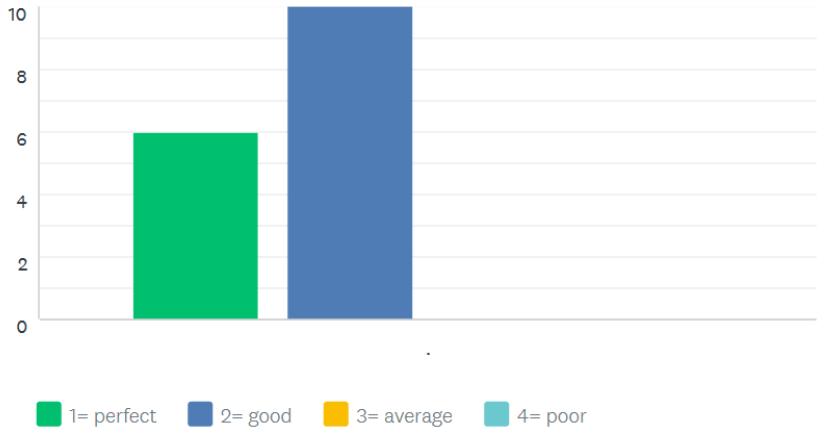
Comments:

1. International technical exchanges and cooperation is a good opportunity to learn, through the introduction of equipment, reference standards, project cooperation, we learn a lot about aspects of technical knowledge and management experience.
2. The knowledge gained in the training is that we have translated documents in Khmer language and developed legislation to carry out this task and to organize the program Train the officials of the NMC.
3. The knowledge gained in the training is that we have translated documents in Khmer language and developed legislation to carry out this task and to organize the program Train the officials of National Metrology Center .
4. I will share what I have learnt with my colleagues at work and with the stake holders.
5. The gained knowledge will be applied in my economy based on our Action Plan.
6. We will conduct a workshop with top management and with inspectors and sub inspectors. The gain expertise will support in preparation for verification of bulk flowmeter using master meter. knowledge with other inspectors. The gained expertise will provide training for verifiers / govt bodies related - improved new procedures - improve assessment.
7. Advise the repairers for the required standard procedure to be used for verification.
8. I will review our national metrological procedures accordingly and plan for procedure amendment later years.
9. 1. IT would help to advocate what changes is needed in our current law. 2. It would help to plan for the facility on bulk flow metering calibration system.
10. It will help me to develop the plans and systems in delivering the metrology services.
11. By this training course, all the knowledge will be shared to all department members and also provincial officers as well by making training. Although we don't have this system but for the first we need to collect all related information and becoming expertise in order to welcome the system of bulk flowmetering as soon as possible.
12. The standard recommendations submitted will be compared against the standards we use, and if there are differences we will discuss as solutions for our institution.
13. The knowledge I have gained from this workshop will be imparted to my colleagues, regulators and policy makers through conduct of seminar and training. With this, they will become aware of what the international practices are and so they will craft relevant regulation.
14. We will discuss on many tests that we think are useful and should be added in our test procedure.

15. The knowledge gained will help our institution to purchase necessary standards for the verification of bulk flow meters, and add one more verification services in our economy.
16. The knowledge can be related to our designated Authorised Verifiers and SPRING colleagues. With that, harmonised verification procedures and requirement can be realised.

Please tick one box below to rate the training on an overall basis.

Answered: 16 Skipped: 6



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. The scene of the practice operation and group presentation is very important link in training courses and highlights.
2. Testing and practice.
3. The practical part of it.
4. Good interaction, group work.
5. Group discussions and presentation
6. Group discussion and learning activities solved as a group and at the same time assisted by the trainers for using correct methods.
7. Practical recording of data and visit the verification system.
8. Theory + Practicals + Calculations
9. Knowing the experiences from others economy and sharing ideas.
10. The most effective part of the training are the knowledges and more experiences from the trainer and especially from the other countries that they already run this field.
11. Procedures, methods of calculation and practice

12. The most effective part of the training was the discussion where the participants and the trainers interact with each other and share their ideas.
13. The most effective part is we study and work together, we share knowledge and exchange information.
14. while most effective part of the training was practical demonstration, the interaction with the other economies has made me understand better and overall I learned a lot.
15. Training was useful mainly with the practical approach demonstrated using the host equipment and setup.

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

Comments:

1. I think the training has been very good.
2. This training should be longer
3. Training time be about a full week.
4. Answer question part at the beginning and end of the practical with group
5. Additional one day for more group discussion and presentation so that more knowledge to be shared
6. Course duration to be increased
7. Practical knowledge doing at the same time we talk about environmental factors and equipment considerations that affect verification errors.
8. More practicals, less theory, exam to trainee.
9. longer duration training and some basic ideas especially on the tests of equipment.
10. As my opinion, I think it is good enough but if you can guys we will need more practices to ensure our getting knowledges from the training are correct.
11. As a whole is good, just lacking the expressed by image, such as the layout of the supporting measures equipment and accompanied by the formula
12. Overall, the training was perfect.
13. Good training course need well planned, well organised and good communication.
14. If the training schedules are distributed to economies, so that we are prepared for what's coming next.
15. Economy report presentation could be do away (wasted time). Instead a straight forward Q&A provided by the Economy for the trainer to understand their situation.

Annex 7: Photographs


Bhutan
Cambodia


EXIT
DIT
Train the Trainer Co
the Verification of Bulk Flow-
using a Master M
24-27 July, 2017, Pattaya


PTB
DIT
APLMF
Train the Trainer Course on
the Verificatio Bulk Flow-metering Systems
Master Meter
24-27 2017, Pattaya, Thail