

MINISTRY OF MANPOWER

TECHNICAL NOTES

For

Workshop to Enhance the Safety of Crane Operation (WESCO)

PART II

Version 1.0

14 October 2014

Workplace Safety and Health Council, Ministry of Manpower, Singapore (MOM)
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Version History

Version	Effective Date	Changes	Author
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1 AIM OF THE MOM TECHNICAL NOTES

1.1 The MOM Technical Notes is a document listing the requirements expected of the Learning Service Providers (LSPs), the facilitators, workshop and facilities suitable for the conduct of the WSH workshop. It also aims to help facilitate LSPs learning process, deliver effective training and conduct competency-based training and assessment.

1.2 The main part of this document contains key information on the **Workshop to Enhance the Safety of Crane Operation (WESCO)**, including the workshop aim, learning objectives, target audience, assumed skills and knowledge, workshop syllabus, workshop duration, class size, and facilitator/learner ratio. It also sets forth guidelines for training delivery and assessment for the workshop.

1.3 This MOM Technical Notes shall be reviewed on a regular basis and or whenever it is deemed necessary due to changes in MOM policy and or requirements, training syllabus and or industrial requirements.

2 MOM TECHNICAL NOTES

2.1 LSP Criteria:

- 1 full time Principal/Manager
- 1 full time f & 1 Associate Facilitator
- 2 facilitators per language per workshop
- bizSAFE Level 3
- Paid up Capital \$5k / \$50K (SOCs)
- ACTA or DACE
- Advanced Certificate in WSH for worker level course
- 5 years of relevant industry experience
- Any other course specific requirement/s

2.2 LSP Facilities:

- Conduciveness of training facilities
- Safe
- Noise
- Lighting
- Sanitary
- Projection
- Tables/Chairs
- Ventilation
- No training in containers/portable cabins

2.3 Workshop to Enhance the Safety of Crane Operation (WESCO)

Overview

Workshop duration - 6 hours comprising 1 hour of assessment

Note: The assessment shall be carried out only during the first WESCO attendance. All subsequent WESCO attendance by the same learner shall constitute a refresher with updates only and no assessment/s.

2.3.1 Written Assessment – 1 hour

The scope of the assessment will cover the following underpinning knowledge:

1. Workplace Safety and Health Act and its Subsidiary Legislation which includes
 - WSH(General Provisions) Regulations
 - WSH (Incident Reporting) Regulations
 - WSH (Risk Management) Regulations
 - WSH (Construction) Regulations
 - WSH (Shipbuilding and Ship-Repairing) Regulations
 - WSH (Operation of Cranes) Regulations
 - WSH (Work at Height) Regulations + Amendments
2. SS 536 : 2008 Code of Practice for the Safe Use of Mobile Cranes
 - Types and configurations
 - Characteristics of crane
 - Principles of operations
 - Site preparation
 - Outrigger use
3. SS 559 : 2010 Code of Practice for Safe Use of Tower Cranes
 - Requirements for use of Tower Crane
 - Checklist for Tower Crane Use
 - Specific considerations for Dockside Tower Cranes
4. Code of Practice on Safe Lifting Operations in the Workplaces
 - Inspection and maintenance (including operation and maintenance logs)
 - Lifting plan requirements
 - Hazard Identification, risk assessment and control measures
 - Permit-to-Work and safe work procedures
5. Interpretation of load charts and related terminologies for different types of crane

6. Lessons learnt from crane-related incidents (involving different types of crane):
- LSPs are required to prepare at least 2 different sets of assessment papers such that no 2 adjacent learners shall receive the same assessment paper except for alternate learners.
 - Facilitator for class is not allowed to be the invigilator for the assessment (same class)
 - Assessment papers are to be issued in accordance with the workshop language registered for only. No mix language assessment is permitted.
 - Facilitator to learner ratio is 1:40
 - A certificate of successful completion of a safety pass/ card shall be issued to each learner who passes the assessment, by the LSP.
 - All training records must be kept by LSP for period of no less than 2 years for audit purpose.

2.4 Checklist for LSPs:

- URA approved use of venue: Commercial School (theory only) or Industrial Training (theory and practical)
- Updated register of all facilitators by language and venue
- Facilitator certification: Advanced Certificate in WSH for worker
- Workshop information to include cancellation and refund policies and transparent to the public
- Accountability for all assessment related materials including assessment question sets i.e. number of sets produced and destroyed
- Guidelines for invigilator and assessors
- Code of conduct for Invigilators and Assessors
- Register to show production, issuance and destruction of safety certificates/pass/card
- All safety certificates/safety pass/card to be issued by LSPs to learners no later than one month from assessment date
- End of workshop evaluation
- LSPs to have copy of LSP Terms and Conditions and workshop related SOP/s

3 OVERVIEW OF THE WORKSHOP REQUIREMENTS

3.1 Learning objectives:

- 3.1.1 State the legal requirements in lifting operation
- 3.1.2 Explain safety precautions in crane operation
- 3.1.3 Describe pre-operational checks on cranes and lifting gears
- 3.1.4 Comply with safe work procedures
- 3.1.5 Interpret load/capacity chart for cranes

- 3.2** Target audience: This workshop is designed for MOM registered crane operators to raise their safety competencies in the operation of cranes e.g. Crawler Crane, Dockside Tower Crane, Mobile Crane (Truck Mounted), Tower Crane (Luffing Jib) and Tower Crane (Saddle Jib)

Topics covered include safety practices for crane operations, updates on safety laws and regulations, safe lifting practices and lessons learnt from recent crane-related accidents.

- 3.3** Workshop duration: 6 hours

- 3.4** Maximum class size: 40 learners

- 3.5** Recommended facilitator/learner ratio:

- Theory Lesson = 1:40 max
- Written Assessment = 1:40 max

- 3.6** Workshop course attendance: 100% attendance.

4 TRAINING DELIVERY ADVICE

- 4.1** Facilitator's guide and learners' workbook/handouts

4.1.1 In order to deliver more effective instruction and ensure consistency in training, a copy of the facilitator's guide shall be prepared. The guide provides the facilitator with information on the workshop including:

- Workshop aim
- Learning objectives
- Target audience
- Assumed skills and knowledge
- Workshop duration
- Class size and facilitator/learner ratio
- Lesson plan
- Workshop contents and instructional materials
- Training methodologies
- Areas of focus/emphasis for each slide/topic
- Training resource requirements
- Workshop administration instruction

4.1.2 The LSP shall also facilitate the learning process by providing each learner with a learners' workbook/handouts to summarize (with illustrations, where possible) key learning points of all the topics covered in the syllabus. This may be in the form of drawings/illustrations rather than words.

4.1.3 The LSP is required to prepare and submit a workshop reference matrix (see Annex B) for coverage of workshop contents with respect to the training slides and the assessment. This is to facilitate cross references between topics and training slides on the said topics.

4.1.4 It is the responsibility of the LSP to ensure that no part of the materials used for the training infringe on patent, design, copyright and intellectual property rights of any individual or organization.

4.1.5 The LSP shall retain an updated version of the training workshop syllabus, lesson plan, facilitator's guide and a learners' workbook/handouts at all times for inspection and verification by appointed auditors.

4.2 Training Methodology

4.2.1 Facilitators are expected to draw upon their facilitator-training in the development and delivery of the training programme and to apply appropriate principles of training in the design and delivery of the workshop.

4.2.2 Many training delivery approaches are appropriate for this workshop which is pegged at learners' level. Training methods shall combine a wide range of delivery methods.

4.2.3 Some of the training methods which can be adopted for the theory lessons are, but not limited to the following:

- Classroom instruction
- Case studies
- Videos and photographs, other e-resources and instructional media

4.3 Training venue requirements

4.3.1 LSP is required to be equipped with sufficient training tools and equipment as well as other relevant equipment such as PPEs, fire-fighting equipment, first aid kit etc.

4.3.2 For the theory training, this is to be conducted in a classroom with supporting training slides, videos, local case studies on incidents and accidents at the worksites.

4.3.3 The LSP shall ensure the classroom has adequate chairs and writing tables to be comfortably spaced for a class of up to 40 learners for conduciveness to the learning process. There must also be adequate land space to comfortably conduct the training and assessment safely. A time device e.g. clock, lightings and ventilation must be adequate for classroom instruction. Emergency exit routes must be clearly marked out and briefed to the workshop learners at the start of the workshop. Necessary equipment such as projectors, multimedia player, whiteboards, flipcharts and any other equipment essential for instruction purpose must be made available.

4.3.4 LSP is to adhere to the conditions stipulated in the LSP Terms and Conditions and this Technical Notes Part II at all times, where applicable. Adequate safety control measures must be taken to ensure the safety of the learners and facilitators during the conduct of the workshop/training at all times.

4.4 Training Requirements:

- 4.4.1 Training site emergency evacuation route – to be briefed at start of workshop
- 4.4.2 Training SOP must be available before the conduct of the workshop
- 4.4.3 Photos/slides of the various types of hazards and control measures associated with crane activities at the worksites
- 4.4.4 Local case studies, where possible, relating to incidents/accidents while working on crane activities
- 4.4.5 Appropriate and relevant PPEs and equipment for classroom demonstration must be made available during the workshop
- 4.4.6 Template of Risk Assessment
- 4.4.7 Training videos

5 ASSESSMENT ADVICE

- 5.1 There shall be a 1-hour Written Assessment (WA) for the workshop comprising 25 MCQs in Section A and Section B (**applicable to first time participants only**)

5.1.1 The learner must pass **BOTH** sections of the WA in order to be issued with the certificate of successful completion. Failure to pass either of the assessments shall render a “Fail” outcome for the learner and he must then re-attempt the workshop and assessment.

S/N	Assessment Activity	Method/Format	Duration
1	Written Assessment	<u>Section A:</u> 20 MCQs – Pass Criteria: 60% <u>Section B:</u> 5 MCQs on load chart interpretation – Pass Criteria: 100% Note: The learner should choose the questions relating to the type(s) of crane which he is certified by MOM to operate.	60 min
	Total Assessment Time		1 hour

5.2 Written Assessment guidelines:

5.2.1 The LSP must administer a Written Test comprising 25 multiple choice questions (MCQs) in Section A and Section B within duration of 1 hour, meeting the pass criteria of both sections.

5.2.2 The options available to the learner if he fails the Written Assessment are:

If learner fails:	Learner needs to re-attend:
Section A	WESCO and Test Section A
Section B	Test Section B
Sections A and B	WESCO and entire Test

5.2.3 During the administration of the written assessment, there shall be an invigilator to ensure the integrity of the assessment process. The facilitator for the workshop is not permitted to be the assessor or invigilator for the same workshop learners during the assessment.

5.2.4 SOP on the upkeep of the confidentiality of the written assessment questions

5.3 Recording and reporting outcome of the Written Assessment

5.3.1 The LSP shall maintain a record of the assessment results for 2 years for inspection by the authorities, when requested.

6 FACILITATOR AND ASSESSOR REQUIREMENTS

6.1 A facilitator and assessor of this workshop should possess the following:

- WSQ Advanced Certificate in Workplace Safety & Health (WSH) qualification or equivalent.
- Lifting Supervisor Safety Course certificate or valid MOM crane operator certificate.
- At least 5 years relevant working experience.
- Advanced Certificate in Training and Assessment (ACTA) qualification or equivalent.

Facilitator and assessor should be separate and independent from one another.

7 END OF WORKSHOP EVALUATION AND FEEDBACK

7.1 The LSP shall conduct an end-of-workshop evaluation, where learners provide quantitative and qualitative feedback on the workshop content, duration, training delivery, training materials, training venue, training resources, quality of facilitators and assessors.

7.2 The LSP shall analyse the feedback provided to improve the delivery of the workshop. Immediate actions shall be taken to address issues with ratings below 3. The actions taken to address issues with a rating of 1 or 2 shall be recorded and kept for audit purpose.

1	2	3	4	5
Poor	Fair	Satisfactory	Very Good	Excellent

8 RELATED WSH LEGISLATIONS, INDUSTRIAL CODE OF PRACTICE AND OTHER REFERENCES (the list is not exhaustive)

- Workplace Safety and Health Act 2006
- WSH (Construction) Regulations 2007
- WSH (Shipbuilding and Ship-Repairing) Regulations 2008
- WSH (Operation of Cranes) Regulations 2011
- WSH (Work at Height) Regulations + Amendments 2013/2014
- SS 536 : 2008 Code of Practice for the Safe Use of Mobile Cranes
- SS 559 : 2010 Code of Practice for Safe Use of Tower Cranes
- Code of Practice on Safe Lifting Operations in the Workplaces
- Technical Advisory on Lifting Equipment (WSH Council website)
- Checklist for Tower Crane Use (WSH Council website)
- Notification Form for Use of Tower Crane in Workplace (MOM website)

Workshop Syllabus

S/N	Learning Objective	Topic	Sub-Topic	Duration (min)	Cognitive Domain	Total
					Knowledge & Comprehension	
1.	State the legal requirements in lifting operation	Legislation on Lifting Operation	<ul style="list-style-type: none"> • Workplace Safety and Health Act and its Subsidiary Legislation <ul style="list-style-type: none"> ▪ WSH(General Provisions) Regulations, WSH (Incident Reporting) Regulations, WSH (Risk Management) Regulations, WSH (Construction) Regulations 2007, WSH (Shipbuilding and Ship-Repairing) Regulations 2008 • WSH (Operation of Cranes) Regulations 2011 	30	24%	24%
2.	Explain safety precautions in crane operation and	Safe Use of Mobile/Crawler Cranes	SS 536 : 2008 Code of Practice for the Safe Use of Mobile Cranes Types and configurations Characteristics of crane Principles of operations Site preparation Outrigger use	60	8%	8%
3.	Describe pre-operational checks on cranes and lifting gears	Safe Use of Tower Cranes	SS 559 : 2010 Code of Practice for Safe Use of Tower Cranes Requirements for use of Tower Crane Checklist for Tower Crane Use Specific considerations for Dockside Tower Cranes	60	8%	8%
4.	Comply with safe work procedures	Safe Lifting Procedures	<ul style="list-style-type: none"> • Code of Practice on Safe Lifting Operations in the Workplaces • Inspection and maintenance (including operation and maintenance logs) 	60	16%	16%

S/N	Learning Objective	Topic	Sub-Topic	Duration (min)	Cognitive Domain	Total
					Knowledge & Comprehension	
			<ul style="list-style-type: none"> Lifting plan requirements Hazard Identification, risk assessment and control measures Permit-to-Work and safe work procedures 			
5.	Interpret load/capacity chart for cranes	Load/Capacity Chart for Cranes	<ul style="list-style-type: none"> Interpretation of load charts and related terminologies for different types of crane 	60	4%	4%
6.	-	Case Studies	<ul style="list-style-type: none"> Lessons learnt from crane-related incidents (involving different types of crane) 	30	15%	15%
7.	-	Assessment	<ul style="list-style-type: none"> Written Test 	60	25%	25%
			Total	360 (6hrs)	60%	100%

Reference Matrix - Workshop to Enhance the Safety of Crane Operation

APPROVED TRAINING SYLLABUS WORKSHOP TO ENHANCE THE SAFETY OF CRANE OPERATION				Coverage of Workshop Contents – for LSP inputs	
(Note: Indicate clearly where the changes are made in accordance with the syllabus)					
S/N	Contents	Remarks	Duration (min)	Indicate slide number E.g. Slide #2.	Indicate mode of assessment, where applicable e.g, Written Assessment, Q3
1.	Legislation on Lifting Operation <ul style="list-style-type: none"> • Workplace Safety and Health Act and its Subsidiary Legislation • WSH (Operation of Cranes) Regulations 2011 	Theory	30		
2.	Safe Use of Mobile/Crawler Cranes <ul style="list-style-type: none"> • SS 536 : 2008 Code of Practice for the Safe Use of Mobile Cranes • Types and configurations • Characteristics of crane • Principles of operations • Site preparation • Outrigger use 	Theory	60		
3.	Safe Use of Tower Cranes <ul style="list-style-type: none"> • SS 559 : 2010 Code of Practice for Safe Use of Tower Cranes • Requirements for use of Tower Crane • Checklist for Tower Crane Use • Specific considerations for Dockside Tower Cranes 	Theory	60		

APPROVED TRAINING SYLLABUS WORKSHOP TO ENHANCE THE SAFETY OF CRANE OPERATION				Coverage of Workshop Contents – for LSP inputs	
(Note: Indicate clearly where the changes are made in accordance with the syllabus)					
S/N	Contents	Remarks	Duration (min)	Indicate slide number E.g. Slide #2.	Indicate mode of assessment, where applicable e.g, Written Assessment, Q3
4.	Safe Lifting Procedures <ul style="list-style-type: none"> • Code of Practice on Safe Lifting Operations in the Workplaces • Inspection and maintenance • Lifting plan requirements • Hazard Identification, risk assessment and control measures • Permit-to-Work and safe work procedures • Interpretation of load charts and related terminologies 	Theory	60		
5.	Load/Capacity Chart for Cranes <ul style="list-style-type: none"> • Interpretation of load charts and related terminologies for different types of crane 	Theory with exercise	60		
6.	Case Studies <ul style="list-style-type: none"> • Lessons learnt from crane-related incidents 	Theory	30		
7.	Written Test	Theory	60		
Total			360 (6hrs)		

Declaration by LSP

I hereby declare that all the training materials and related particulars / information given are true and correct nor have I infringed any copyright related issues in this entire accreditation process/application

Name of LSP

Name of Applicant

Designation of Applicant

Applicant's Signature

Date

Head/Principal's Signature

Date

Assessment Plan

- 1 Overview
- 2 Assessment method and duration
- 3 Instruction for preparation of written assessment
- 4 Assessment Instruments
- 5 Assessment Record

1 Overview of Assessment Plan (listed by topics)

Topics	Lecture (hour)	Practical (hour)	Assessment Mode	Total (hour)
1. Workplace Safety and Health Act and its Subsidiary Legislation which includes <ul style="list-style-type: none"> • WSH(General Provisions) Regulations, WSH (Incident Reporting) Regulations, WSH (Risk Management) Regulations, WSH (Construction) Regulations 2007, WSH (Shipbuilding and Ship-Repairing) Regulations 2008, WSH (Operation of Cranes) Regulations 2011 				
2. SS 536 : 2008 Code of Practice for the Safe Use of Mobile Cranes <ul style="list-style-type: none"> • Types and configurations • Characteristics of crane • Principles of operations • Site preparation • Outrigger use 	5.0	0	WA	5.0
3. SS 559 : 2010 Code of Practice for Safe Use of Tower Cranes <ul style="list-style-type: none"> • Requirements for use of Tower Crane • Checklist for Tower Crane Use • Specific considerations for Dockside Tower Cranes 				
4. Code of Practice on Safe Lifting Operations in the Workplaces <ul style="list-style-type: none"> • Inspection and maintenance (including operation and maintenance logs) • Lifting plan requirements • Hazard Identification, risk assessment and control measures 				

<ul style="list-style-type: none"> • Permit-to-Work and safe work procedures <p>5. Interpretation of load charts and related terminologies for different types of crane</p> <p>6. Lessons learnt from crane-related incidents (involving different types of crane)</p>				
Written Assessment (Hour)				1
Total Duration (Hours)				6

WA = Written Assessment

2.1 Instruction for preparation of Written Assessment

These instructions concern the written assessment of the learner's competency

Specification item	Details on specifications
Learning outcome	Fulfill the workshop learning objectives for all topics to be assessed
Duration	1 Hour
Venue	Classroom
Set up	<ul style="list-style-type: none"> • Classroom setup for 40 learners. • Tables & chairs for individual seating • Projector and monitor • Whiteboard & markers of different colours • Whiteboard duster • 2B pencil and eraser for each learner • Printed answer sheet • Common Clock
Conduct of the Written Test	<ul style="list-style-type: none"> • Brief learners to check if they have been given the correct test set • Brief learners on the time allocated for the test • Brief learners on the close book test format. • Brief learners that they cannot refer to any material or notes or discuss the questions with any other learners during the test • Brief learners that they are allowed to ask the assessor to explain the question/s • Brief learners on the passing mark requirement for Section A and Section B of the Written Assessment • Highlight that assessment is for first WESCO attendance only. All subsequent WESCO attendance by the same learner shall constitute a refresher with updates only and no assessment/s.

3 Assessment Instruments

Facilitators need to prepare learners to meet the requirements in para 2.1 for the WA.

4 Assessment Records

Workshop to Enhance the Safety of Crane Operation

Approved Assessment Centre: _____

Learner's Name:	Date of Assessment:
Learner's NRIC/Passport/FIN:	

Overall Assessment

Written Assessment	Pass / Fail (Marks: _____ %)
Overall Assessment	Pass / Fail

Assessor 1: Name & Signature	Assessor 2: Name & Signature
Date:	Date:

Assessor Feedback: Overall performance of workshop learners. For NYCs, areas of skills gap and improvements to recommend
