TRAINING MODULE

PRINCIPLES AND APPLICATIONS IN COMPLIANCE TO MALAYSIAN STANDARD MS1525: CODE OF PRACTICE ON ENERGY EFFICIENCY 7 USE OF RENEWABLE ENERGY IN NON-RESIDENTIAL BUILDING

PROGRAM OUTLINE DAY 1

Time	***Topic***	***Duration***
8.30 a.m	***Participants Registration***	***30 mins***
9.00 a.m.	***Introduction & Overview of the Training Program***	***15 mins***
9.15 a.m.	***Chapter 1: Background and Introduction to MS1525*** *1.1 Introduction* *1.1.1 Climate change and current scenario* *1.1.2 Global and local trends* *1.1.3 Standards and labelling* *1.1.4 Policies and legislation* *1.2 MS152:2007 Code of practice* *1.2.1 Introduction* *1.2.2 History* *1.2.3 Purpose* *1.2.4 Scope*	***1 hr***
10.15 a.m.	***Break***	***15 mins***
10.30 a.m.	***Chapter 2: Architectural And Passive Design Strategy*** *2.1 Scope* *2.2 Sustainable Design Approach* *2.3 Passive design strategy* *2.4 Site planning and orientation* *2.5 Daylighting* *2.5.1 Daylight distribution (calculation)* *2.6 Façade design* *2.7 Natural ventilation* *2.7.1 Cross ventilation* *2.7.2 Stack ventilation* *2.7.3 Air movement* *2.7.4 Daylighting and ventilation from windows* *2.8 Strategic landscaping* *2.9 Future considerations for sustainable design*	***1 hr 10 mins***
11.40 a.m.	***Chapter 3: Building Envelope*** *3.1 Scope* *3.2 General Requirements* *3.3 Concept of Overall Thermal Transfer Value (OTTV)* *3.3.1 Fenestration* *3.4 Shading coefficient* *3.5 Daylight* *3.5.1 Types of technology* *3.6 Roofs*	***1 hr 10 mins***

	3.6.1 Roof Thermal Transfer Value (RTTV) *3.7 Roofs with skylights* *3.7.1Concept of Overall Thermal Transfer Value (OTTV)* *3.7.2Equivalent temperature difference* *3.7.3Solar factor* *3.8 Daylight credit* *3.9 Submission procedure* *3.10 Air leakage* *3.10.1 General requirement* *3.10.2 Vestibules*	
1.00 p.m.	*Lunch Break*	***1 hr 15 mins***
2.15 p.m.	***Chapter 4: Lighting*** *4.1 Scope* *4.2 General principles of efficient lighting practice* *4.2.1 Types of lamps* *4.2.2 Lighting design* *4.2.3 Lumen method of calculation* *4.2.4 Illuminance* *4.2.5 Coefficient of utilization* *4.2.6 Maintenance factor* *4.3 Maximum allowable power for illumination systems* *4.4 Exterior building lighting power requirements* *4.5 Lighting controls* *4.5.1 Lighting zones control for daylight energy savings scheme* *4.5.2 Control accessibility* *4.6 Operation and maintenance (O & M) manual and as built drawings*	***50 mins***
3.15 p.m.	***Tea break***	***15 mins***
3.30 p.m.	***Chapter 5: Electric Power and Distribution*** *5.1 Scope* *5.2 Alternating current (AC) Electric motors* *5.2.1 Types of motor* *5.2.2 Output rating and duty* *5.2.3 Motor efficiencies and oversizing* *5.2.4 Motor power factor* *5.2.5 Cost savings with high efficiency motors* *5.2.6 Motor drives* *5.3 Cabling* *5.3.1 Optimum cable size* *5.4 Transformers* *5.4.1 Construction types* *5.4.2 Application types* *5.4.3 Sizing* *5.4.4 Transformer losses* *5.4.5 No-load loss, or iron loss* *5.4.6 Load –loss, or copper loss*	***1 hr***

	5.4.7 Stray- loss, which is largely load related *5.4.8 Extra losses due to harmonics and reactive power* *5.4.9 Extra losses due to harmonics* *5.5 Variable speed drive- VSD/Inverters* *5.6 Power factor* *5.6.1 Understanding power factor* *5.6.2 Power factor surcharge* *5.6.3 Causes of low power factor* *5.6.4 How to improve your power factor* *5.7 Power factor correction capacitors* *5.7.1 Benefits of improving power factor* *5.8 Sub metering*	
4.30 p.m.	***Chapter 6: Air Conditioning and Mechanical Ventilation (ACMV) Systems*** *6.1 Scope* *6.2 Load calculations* *6.2.1 Calculation procedures* *6.2.2 Indoor design conditions* *6.2.3 Outdoor design conditions* *6.2.4 Ventilation* *6.3 System and equipment sizing* *6.4 Separate air distribution systems* *6.5 Controls* *6.5.1 Temperature control* *6.5.2 Humidity control* *6.5.3 Energy recovery* *6.5.4 Off-hour control* *6.5.5 Mechanical ventilation control* *6.5.6 Fan system efficiency* *6.6 Piping insulation* *6.7 Air handling duct system insulation* *6.8 Duct construction* *6.9 Balancing* *6.10 ACVM system* *6.11 ACVM system equipment* *6.12 ACVM system components* *6.13 ACVM system equipment / component – heat –operated (absorbtion), cooling mode* *6.14 System testing and commissioning* *6.15 Operation and maintenance (O & M) and as-built drawings* *6.16 Preventive maintenance*	***1 hr***
6.00 p.m.	***End of Day 1***	

PROGRAM OUTLINE DAY 2

Time	***Topic***	***Duration***
9.00 a.m.	***Chapter 6: Air Conditioning and Mechanical Ventilation (ACMV) Systems (…cont.)***	***1 hr 30 mins***
10.30 a.m.	***Break***	***15 mins***
10.45	***Chapter 6: Air Conditioning and Mechanical Ventilation (ACMV) Systems (…cont.)***	***30 mins***
11.15 a.m.	***Chapter 7: Energy Management Control System*** *7.1 Scope* *7.2 Energy Management System (EMS)* *7.3 Control equipment* *7.4 Monitoring equipment* *7.5 Integration of equipment subsystems* *7.6 Energy consuming areas* *7.6.1 Air conditioning and mechanical ventilation (ACMV)* *7.6.2 Lighting system* *7.6.3 Others* *7.7 Application of an EMS to the ACMV system* *7.7.1 Central plan* *7.7.2 Air handling units (AHU)* *7.7.3 Terminal Units* *7.7.4 Mechanical ventilation* *7.8 Application of EMS to the lighting system* *7.8.1 Common areas* *7.8.2 Work areas* *7.9 Application of an EMS to the Energy Audit* *7.10 Characteristic of EMS*	***1 hr***
1.00 p.m.	***Lunch Break***	***1 hr 15 mins***
2.15 p.m.	***Chapter 8: Building Energy Simulation Method*** *8.1 Scope of Building Energy Simulation Method* *8.2 Simulation Program* *8.3 Compliance* *8.4 Exceptional Compliance*	***1 hr***
3.15 p.m.	***Tea break***	***15 mins***
3.30 p.m.	***Group Case Discussion and Presentation*** *Understanding of the course (no test)*	***1 hr 30 mins***
5.00 p.m.	***End of Training***	