Report on

Three Day Advanced Programme on

Energy Conservation Building Code - Simulation

24th -26th November 2016

at Agricultural Co-operative Staff Training Institute, Manvila, Thiruvananthapuram

This report includes

Three Day Advanced Programme on ECBC Simulation from 24th -26th November 2016 at Agricultural Co-operative Staff Training Institute, Manvila, Thiruvananthapuram

EMC had conducted a three day advanced programme on ECBC simulation for 30 engineers and architects for the group of engineers and architects who had attended the previously held two day capacity building awareness programme on ECBC for 250 engineers at EMC campus. It was held at the computer training lab with net access at Agricultural Co-operative Staff Training Institute, Manvila. The trainers who conducted the programme were Shri. Gaurav Shorey (ECBC Master Trainer), Shri. Maaz Akbar Khan and Shri. Yogesh Bharadwaj who works at PSI Energy, Delhi. The programme began with the inaugural address taken up by Shri. Sasikumar T (Chief Electrical Engineer). Followed by this Shri. A M Narayanan (Head-Energy Efficiency Division,EMC) gave a presentation on the programme outcome and the programme implications. The training on first day began with Shri. Gaurav Shorey taking up a class on using Climate Consultant. The participants were taught to use the weather files and sun chart diagrams. A session on Autodesk Ecotect Analysis 2011 was taken up for calculating the EPI of a space. At the end of the day, Relux was taught to the participants. The next day participants were taught how to use the Design Builder Software. At the end of the training session, participants were put in groups and were asked to perform Energy Performance Index (EPI) calculations of a building of their choice. A valedictory session was held wherein the Director of EMC – Shri. K M Dharesan Unnithan spoke on the importance of ECBC implementation in the forthcoming PWD projects. He even emphasized on chairing a few meetings in EMC before finalizing the drawing plans. Shri. A M Narayanan gave a presentation on the design packages to be used for KPWD. He mentioned of the various schedules to be used for designing an energy efficient building. Finally, Smt. Beena L(Deputy Chief Engineer, Admin –PWD) spoke a few words on the collaboration of EMC and PWD henceforth in the construction of GRIHA/ ECBC compliant buildings and on the absence of iconic or monumental buildings for the future. Participants were given a chance to present their feedback on the training session. Certificates were given to the all the participants.

Above: Group photograph of the various dignitaries from PWD, EMC, trainers and participants

Above: Shri. Gaurav Shorey while conducting the training

Above: Shri. Maaz Akbar Khan during the classroom session

Above: Participants during the practice session

Above: The training session in progress

Above (from left): Shri. Girish V S (Senior Architect-PWD), Smt. Beena L(Deputy Chief Engineer, Admin –PWD), Shri. K M Dharesan Unnithan (Director-EMC), Shri. A M Narayanan (Head-EED,EMC), Smt. Jasmine T B(EE, Buildings-KPWD) and the trainers – Shri. Yogesh Bharadwaj, Shri. Maaz Akbar Khan and Shri. Gaurav Shorey

Above: A participant during the feedback session

Advanced Training Program on Energy Simulation

Day 1	
Inaugural Session	
Registration	
Welcome address	
Inaugural Speech	
Presentation - Status of ECBC in the State of Kerala	
Tea break	
Technical Session I	
Introduction to Building Physics - I	Building Energy Perspective
	Internal & External Heat Gains
Lunch Break	
Technical Session II	
Introduction to Building Physics - II	Mechanism of Heat Transfer
	Thermo-physical Properties of Envelope
Tea break	
Technical Session III	
Building Envelope	Optimizing design to reduce external heat gains: • Orientation & WWR • Optimizing envelope: U/R value • Fenestration design: Shading design • Achieving ECBC prescribed SHGC. • Achieving Daylight Factor as per SP41 • Daylight Simulation using Ecotect/Radiance
Lighting & Electrical	Optimizing Internal heat gains • Lighting Power Density (DIALux software) • Achieving NBC Illuminance levels (DIALux software)

Day 2	
Technical Session IV	
ECBC Compliance Path	ECBC Compliance Options
	Mandatory and Prescriptive Requirements for ECBC
	Prescriptive Method
	Trade Off Method
Tea break	
Technical Session V	
Energy Simulation: Introduction	Need of Energy Simulation : ECBC Whole building performance method
	Target of Energy Simulation : Energy performance Index and Thermal comfort (NBC/ ASHRAE/GRIHA) baseline
	Inputs required for building energy modelling.
	Climate data: Weather file-types & introduction.
Lunch Break	
Technical Session VI	
Design Builder : Introduction	Energy simulation Model Setup
	Installation/Context Location and region ,Weather file
Building Geometry	Understanding Design Builder Interface.
	Building, Block, Zone, Partitions, Constructions (Envelope: roof, external wall, windows, shading devices)
Tea break	
Technical Session VII	
Internal loads and schedules	Occupancy, Lights, Equipment, Thermostats schedules
Initializing Simulation	Selecting Simulation period: Annual/Summer Design etc, Output Interval, Temperature Control, Energy & Comfort Outputs
Results Analysis	Load vs Energy, Peak Electrical Consumption, Peak Electrical Demand Load.
Exporting Results	DB/Energy Plus HTML output
	DB Result Viewer graphical output

Day 3	
Technical Session VIII	
HVAC Systems: Introduction	HVAC basics & analyzing heat load components: Sensible and Latent load
	Estimation of heat load for a room (Carrier HAP)
	Types of HVAC Systems – DX, VRF & Fan coil chilled water system.
	HVAC Simple & Detailed Mode
Tea break	
Technical Session IX	
HVAC Modelling in Design Builder	Introduction to Detailed HVAC Interface.
	Set point temperature, System efficiencies and controls.
	Modeling HVAC systems and Simulating.
	Heating/Cooling Load estimates and energy consumption.
Lunch Break	
Technical Session X	
Standard & Proposed Model	Baseline vs proposed model w.r.t ECBC/ASHRAE methodology.
	Developing the baseline & Proposed model.
	Simulating & Comparing the two cases for ECBC compliance.
Tea break	
Concluding Session	
Open Discussion	
Conclusion and Presentation of Certificates	
Vote of Thanks, EMC	

Training Evaluation Form – Three day advanced training programme on ECBC simulation (24th -26th November 2016), Agricultural Co-operative Staff Training Institute (ACSTI), Manvila, Thiruvananthapuram

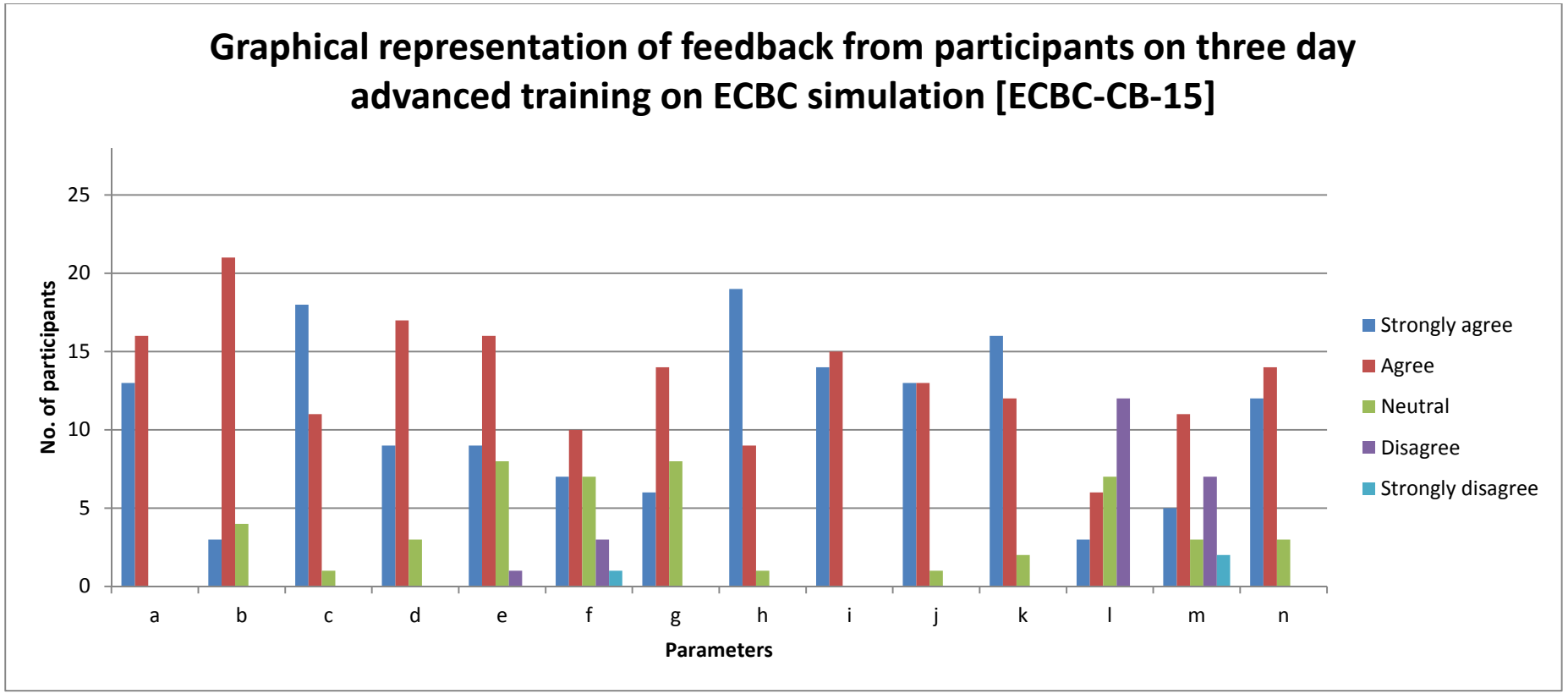
Trainer: Shri. Gaurav Shorey

Instructions: Please indicate your level of agreement with the statements listed below.

Sl . No.		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1.	The objectives of the training were clearly defined					
2.	The course content was comprehensive					
3.	Participation and interaction were encouraged					
4.	The topics covered were relevant to me					
5.	The content was organized and easy to follow					
6.	The materials distributed were useful					
7.	This training experience will be useful in my work					
8.	The trainer was knowledgeable about the topics					
9.	The trainer was well prepared					
10.	The trainer was clear in communication					
11.	Communication and interaction with trainer was good					
12.	The time allotted for the training was sufficient					
13.	The training hall and facilities were adequate and comfortable					
14.	Food and refreshments served were good					

15. Any suggestions for further training.

Thank you for your feedback



(a) The objectives of the training were clearly defined **(b) The course content was comprehensive** **(c) Participation and interaction were encouraged**
(d) The topics covered were relevant to me **(e) The content was organized and easy to follow** **(f) The materials distributed were useful**
(g) This training experience will be useful in my work **(h) The trainer was knowledgeable about the topics** **(i) The trainer was well prepared**
(j) The trainer was clear in communication **(k) Communication and interaction with trainer was good**
(l) The time allotted for the training was sufficient **(m) The training hall and facilities were adequate and comfortable**
(n) Food and refreshments served were goood

Suggestions for further training

-Training materials to include literature/ study material

-More comprehensive training required/ more time

- Computer issues to be fixed and to be kept ready before start for training. Lot of time lapse between system format, etc.

- The topics are more theoretical and the practical side must be discussed

- Please provide computer/ software for everyone

-Software used for the training programme/ workshop could have been installed in all the systems prior to the training workshop. A little more time for each software training would be more beneficial for the participants

-Clearly 3 days training programme on the introduced software's were not sufficient to implement ECBC in the government sector

- Frequent training of this type would be appreciated

- A strong base was needed for hands on training. For eg:- Computers provided couldn't meet the training programme(80% of the systems were outdated). Being an architect knowing HVAC and other details to the core are not needed. Basic idea and knowledge are good. However knowing HVAC in a vast level was good. Came to know that things on ECBC are not simple.

- Expecting more of this type of training and availability of software for doing the same training further

-To be conducted regularly and in all districts in Kerala

- Design members like columns, beam slab input parameter can be implemented in this software to perform the accuracy and precision of the factors considered for EPI

-Application of this softwares for evaluation of existing buildings can also be addressed. CAPSOL – developed by VSSC have good rating and may also be incorporated in this database

- Really appreciate the training programme. Need to have a more dedicated training programme with adequate training material and support

-Programmes have to be installed on the computer before the session started. Computer should be incompetent according to the nature of the programmes to be installed

- The training programme was very informative. Moreover the faculty members are very strong and taught us very patiently.

List of participants for Three day Advanced Training Programme on ECBC Simulation at ACSTI, Manvila, Thiruvananthapuram

Sl. No	Name	Designation & Office
	ARCHITECTURAL WING	
1	Sri. Anil Kumar P	Senior Architect, O/o the CA, Trivandrum
2	Sri. C P Balamurugan	Senior Architect, O/o the CA, Trivandrum
3	Sri. S.S Ajayakumar	Senior Architect, O/o the CA, Trivandrum
4	Sri.Roy Leslie	Senior Architect, O/o the CA, Trivandrum
5	Smt. Surya Nair	Deputy Architect, O/o the CA, Trivandrum
6	Sri.Abdul Aleef M.S	Deputy Architect, O/o the CA, Trivandrum
7	Sri.Jose.D	Deputy Architect, O/o the CA, Trivandrum
8	Sri.Sujeer.K.S	Deputy Architect, O/o the CA, Trivandrum
9	Sri.Rajeevan D	Deputy Architect, O/o the CA, Trivandrum
10	Smt.Saritha Shaji	Deputy Architect, O/o the CA, Trivandrum
11	Smt.ChandniUnnikrishnan	Deputy Architect, O/o the CA, Trivandrum
12	Smt. Nithya.M.K	Deputy Architect, O/o the CA, Trivandrum
13	Sri.K.V Balakrishnan	Architectural Assistant, O/o the CA, Tvm
14	Smt.Padmambika S	Architectural Assistant ,O/o the CA, Tvm
15	Smt. Bindu C Elias	Architectural Assistant, O/o the CA, Tvm
16	Smt. Sumole.R	Architectural Assistant, O/o the CA, Tvm
	BUILDINGS DESIGN WING	
17	Sri. Rahul Leslie	Deputy Director, Buildings Design, O/o the CE
18	Smt Gayathry S	Deputy Director, Buildings Design, O/o the CE
19	Sri.Rakesh T Menon	Asst Director, Buildings Design, O/o the CE
20	Sri.Santhosh Babu V	Asst Director, Buildings Design, O/o the CE
21	Sri.Sabarish J	Asst Director, Buildings Design, O/o the CE
	BUILDINGS WING	
22	Sri. M. Jagadeesh	AEE, Buildings Sub Division, Thalasserry
23	Sri. K. Jose Rajan	AEE, Building Sub Division, Pala

24	Sri. Shelly James	AE, Buildings Section, Nedumkandam
25	Sri. Biju G	AE, Spl. Buildings No.2, Kozhikkode
26	Smt. Deepti	AE, Buildings Section, Wadakkakkancherry
	ELECTRICAL WING	
27	Sri. V. Ajith Kumar	AEE, PWD Electrical Division, Thrissur
28	Sri. P.Suresh Babu	AEE, PWD Electrical Sub Div, Kalpetta
29	Sri. C. Dinesh	AEE, PWD Electrical Sub Div, Pathanamthitta
30	Sri. Prasanthkumar Govindan	AE, PWD Electrical Section, Kasaragod
31	Sri. S. Bipin	AE, PWD Electrical Section, Trivandrum
	Officials present at Inaugural function from PWD	
1	Shri. Sasikumar T	Chief Electrical Engineer, PWD, Trivandrum
	Officials present at Valedictory function from PWD	
1	Smt. Beena L	Deputy Chief Engineer, Admin, PWD, Trivandrum
2	Smt. Jasmine T B	EE, Buildings Division, Trivandrum
3	Shri. Girish V S	Senior Architect, O/o the Chief Architect, Trivandrum
4	Smt. Smitha Theophilis	AXE, HRD, PWD, Trivandrum
Support Staff from EMC		
1	Shri. Johnson Daniel	Energy Technologist-C
2	Shri. Sandeep K	Energy Technologist – B
3	Shri. Sarath Krishnan	Project Engineer
4	Smt. Bency Sam	Project Engineer
5	Smt. Jeena John	Project Engineer
6	Shri. Tomson Sebastian	Project Engineer
7	Shri. Asif Abbas	Project Engineer

Trainers		
1	Shri. Gaurav Shorey	Executive Team Member, PSI Energy
2	Shri. Maaz Akbar Khan	Team Member, PSI Energy
3	Shri. Yogesh Bharadwaj	Team Member, PSI Energy