

Passive House in the Tropics

Introductory Workshop on Building Energy Simulation

IBPSA Indonesia
Summer Simulation Camp

Bandung, Indonesia
20 – 24 July 2019

Instructor: Dr. Ery Djunaedy



Information and Registration

<http://bit.ly/SimulationCamp>

Co-organized by:
Center for High Performance Buildings and Cities, Walungan Foundation
IBPSA Indonesia



OBJECTIVE

This summer simulation camp is an introductory workshop for building performance simulation. It introduces the concept of building performance, and how to perform calculations to quantify the performance.

This IBPSA Indonesia Summer Simulation Camp focuses on building energy simulation using EnergyPlus. HoneyBee is selected as the interface to EnergyPlus (from a list of other interfaces to EnergyPlus) as it can offer a lot more than just an interface to EnergyPlus. HoneyBee comes with other “bugs” that can work together to help perform performance calculations beyond EnergyPlus.

Passive House is selected as a case study simply because it has various performance criteria that can be used as a case study to explain how simulation should be used in practice: to achieve targeted performance and proof compliance.

Beyond that, the Passive House concept for the tropics is an interesting concept. Indonesia in particular will face an increase of air conditioning use in residential sector, and that comes with a huge energy penalty if the house is not designed to be air conditioned. Passive House concept can be one solution to the energy problem.

Disclaimer: Note that this summer camp is NOT a preparatory course for passive house professional certification, and has no connection with the Passive House Institute or any other passive house institutions.

TARGET AUDIENCE

This summer camp is targeted primarily toward building designers: architects and engineers. Of course we welcome academics (professors and researchers) and students. The diverse background of the participants will enrich the discussion through out the summer camp.

There is absolutely **no pre-requisite** to this camp. People with zero experience to building simulation is welcome to join this program.

CO-ORGANIZERS

This simulation summer camp is co-organized by the Center of High Performance Buildings and Cities, Walungan Foundation and the IBPSA Indonesia. The Simulation Summer Camp (with various relevant topics) will be IBPSA Indonesia’s annual event.

TIME AND LOCATION

The camp will be held on 20-24 July 2019 in Bandung, Indonesia.

FEE

IBPSA Indonesia Member/Full time student: IDR 3,000,000

IBPSA Indonesia Non-Member: IDR 3,500,000

International Participants: IDR 4,000,000

The fee includes:

- 5-day simulation camp
- Softcopy of all workshop materials (there will be no printed materials for the workshop)
- Accommodation for 5 nights (check-in on 19-Jul-2019 and check-out on 24-Jul-2019)
- Meals for breakfast and lunch (dinner on your own).

INSTRUCTOR

Dr. Ery Djunaedy is a consultant in the area of building physics and building performance simulation. He has degrees in the area of Building Physics/Science from the Institut Teknologi Bandung, Indonesia, National University of Singapore, and Technische Universiteit Eindhoven, Netherlands. His main interest is in the deployment of advanced simulation tools during the building design process. He has used advanced simulation tools like the energy and computational fluid dynamics simulations to design high performance buildings in Singapore, US and Indonesia. He has taught building physics courses to architecture and engineering students in the Netherlands, UAE, US and Indonesia. Nowadays he divides his activities between designing high performance green building, teaching building physics, developing professional associations, drafting background materials for policy development in the area of energy efficiency, and enjoying Indonesia country sides. He is the founding and current President of IBPSA Indonesia.

PROGRAM AND SYLLABUS

The summer simulation camp is a 5-day workshop on building energy simulation using EnergyPlus through HoneyBee, to a total of 37 hours of learning. The Passive House concept and criteria is used as a case study on how to define and conduct simulation projects.

The camp will use a combination of lectures, hands-on structured exercise, and practical design exercise. Participants will be working in groups to actually design a Passive House, conduct simulations to achieve performance criteria and proof compliance, write a report and present the result to the whole group.

The camp program starts on Saturday, so that the whole 5-day program needs only three working days, in case somebody needs to take some days off to attend this camp. Furthermore, the program ends on Wednesday. For those who wants to extend your stay, exploring Bandung is nicer during weekdays compared to weekends due to severe traffic jams during weekends.

The syllabus is as follows.

Time	Ses- sion	Topic	Description
DAY 0			
14:00 - 15:30	HOTEL CHECK-IN		
15:30 - 16:00	Coffee Break		
16:00 - 17:00	0	Welcome session	
17:00 - 18:00	0	Welcome session	
DAY 1			
08:00 - 09:00	1	Introduction to the IBPSA Summer Camp	Welcome, objectives, camp rules
09:00 - 10:00	2	Introduction to the performance concept in buildings	Building performance concept and how to quantify performance
10:00 - 10:30	Coffee Break		
10:30 - 11:30	3	Introduction to Rhino, Grasshopper, Ladybug, Honeybee (and other insects)	Introducing the tools used throughout the camp
11:30 - 12:30	4	Running EnergyPlus from Honeybee	EnergyPlus through interface
12:30 - 13:30	LUNCH		
13:30 - 14:30	5	Running EnergyPlus through text interface	How to run EnergyPlus directly from the engine
14:30 - 15:30	6	Structure of EnergyPlus input file	Working in text mode
15:30 - 16:00	Coffee Break		
16:00 - 17:00	7	Geometry definition with HoneyBee	HoneyBee is the main interface to EnergyPlus for this workshop
17:00 - 18:00	8	Geometry definition with HoneyBee	
DAY 2			
08:00 - 09:00	9	Materials and Constructions in EnergyPlus	Opaque construction definition
09:00 - 10:00	10	Materials and Constructions in EnergyPlus	Glazed construction definition
10:00 - 10:30	Coffee Break		
10:30 - 11:30	11	Exercise: materials and constructions in EnergyPlus	Material and construction definition exercise
11:30 - 12:30	12	Exercise: materials and constructions in EnergyPlus	
12:30 - 13:30	LUNCH		
13:30 - 14:30	13	Thermal Bridge: definition and calculation	Definition of thermal bridge
14:30 - 15:30	14	Thermal Bridge: definition and calculation	Quantification of thermal bridge using Therm
15:30 - 16:00	Coffee Break		
16:00 - 17:00	15	Exercise: thermal bridge	Thermal bridge exercise using Honeybee and Therm
17:00 - 18:00	16	Exercise: thermal bridge	
DAY 3			
08:00 - 09:00	17	Internal gains definition	How to define internal gains in HoneyBee
09:00 - 10:00	18	Schedules definition	Including new schedules in HoneyBee
10:00 - 10:30	Coffee Break		
10:30 - 11:30	19	HVAC system in EnergyPlus	How EnergyPlus defines and calculates HVAC system
11:30 - 12:30	20	Definition of HVAC system for a Passive House	Defining VRF HVAC system
12:30 - 13:30	LUNCH		
13:30 - 14:30	21	Alternative workflow: hybrid method	How to define EnergyPlus input files using hybrid method (HoneyBee and Text-mode)
14:30 - 15:30	22	Definition of HVAC system using spreadsheet	EnergyPlus input file is a text file. Complex HVAC system can be defined easily using spreadsheet.
15:30 - 16:00	Coffee Break		

16:00 - 17:00	23	Simulation settings, result analysis and reporting	Different reporting options in EnergyPlus including summary and hourly results
17:00 - 18:00	24	Exercise: writing simulation report	Introducing score card spreadsheet as a tool to write simulation report
DAY 4			
08:00 - 09:00	25	Comfort cooling	Lecture: introduction to thermal comfort for the tropics
09:00 - 10:00	26	Comfort cooling	
10:00 - 10:30	Coffee Break		
10:30 - 11:30	27	Cooling a Passive House	Passive House criteria: design principles and component selection
11:30 - 12:30	29	Insulation and airtightness	Passive House criteria: design principles and component selection
12:30 - 13:30	LUNCH		
13:30 - 14:30	30	Ventilation system	Passive House criteria: design principles and component selection
14:30 - 15:30	31	Passive house criteria:	developing simulation strategies to proof compliance
15:30 - 16:00	Coffee Break		
16:00 - 17:00	32	Putting it all together: designing a passive house.	Exercise
17:00 - 18:00	33	Putting it all together: designing a passive house.	Exercise
DAY 5			
08:00 - 09:00	34	Putting it all together: designing a passive house.	Exercise
09:00 - 10:00	35	Putting it all together: designing a passive house.	Exercise
10:00 - 10:30	Coffee Break		
10:30 - 11:30	36	Presentation	Presenting simulation result
11:30 - 12:30	37	Presentation	Presenting simulation result
12:30 - 13:30	LUNCH (Hotel Check-out)		
13:30 - 14:30		Evaluation and Open QA	
14:30 - 15:30		Closing	

LANGUAGE

The language of instruction during the workshop will be in English. The camp provides full support for Indonesian language.

COMPUTER

Participants are required to bring a laptop for the summer camp. The organizer will not provide any laptop or computer for participants to use. The programs used in the workshop works in MS-Windows and Mac. The organizer will only provide full support for MS-Windows. It is suggested that all participants have installed all the required programs prior to the start of the camp.

SOFTWARE

HoneyBee is a plugin of Grasshopper, and Grasshopper is a plugin of Rhino. Rhino is the only paid program used in this camp. For those who does not have a license of Rhino, we suggest to use the trial version that is valid for 30 days. Please do not install the trial version now, as it will be expired before the camp. We will send out installation instructions when the time comes, so that everybody can use the trial version of Rhino for this summer camp.

The other programs used in this camp is free. Installation instructions will be sent later.

VENUE AND ACCOMMODATION

The summer camp will be hosted in Wisma Puri Larasati, Bandung Indonesia. Bandung is a city with cooler temperature (in tropical standard).

Wisma Puri Larasati: <https://goo.gl/maps/VLWY9YF4rDyKsgTt6>

All participants will occupy six apartments; each has two bedrooms of double occupancy. Four participants (of the same gender) will share one apartment. These four participants will form a group that will work on the design project for the workshop.

For extension of your stay in Bandung after the camp program, please contact the organizer.

HOW TO GET HERE

Bandung has direct flights from neighboring countries, namely from Kuala Lumpur, Malaysia and Singapore. The airport of Bandung is Husen Sastranegara (airport code: BDO).

Alternatively, Bandung can be reached through Jakarta (Soekarno Hatta International Airport, CGK). From Jakarta Airport, you can take the train or shuttle bus to take you to Bandung.

For local transport, Grab and Gojek are the two online taxi provider. There are also a number of conventional taxi operators in town.

CONTACT

On registration and technical programs:

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On sponsorship and accommodation:

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PHOTO CREDIT

Top photo: A passive house in Oregon designed by Holst Architecture and built by Hammer & Hand. Passive House Institute & Alliance U.S. / Flickr Creative Commons

Bottom photo: The surface temperature of a row of Brooklyn townhouses during a winter night. The house that appears blue was renovated to passive house standards by Fabrica718. This thermal image shows clearly that passive house has less thermal bridge. Photo courtesy Sam McAfee of www.SGBuild.com