Presented by:
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Executive Engineer (Audit)
Program for Supporting Rural Bridge,

1 Year Master's in Environmental Engineering and Management course

Course duration: 10.08.2021 – 31.07.2021

Funded by : LGED's Human Resource Development and Capacity Enhancement Project.

Local Government Engineering Department

- Nominated For PGD Course
- PGD : 24 Credit Only Course Work.
- Completed 1 year Master Program (30 credit)
- 24 Credit Course Work + Research Work 6 credit

Course Duration 1 year

Two semester and One Inter semester

Programme Overview

Environmental Engineering and Management Program is part of the Department of Energy, Environment and Climate Change, School of Environment, Resources and Development. AIT Thailand

- looks for solutions to environmental problems, water supply and sanitation, wastewater treatment and disposal systems, air pollution, solid and hazardous wastes, waste minimization, and life cycle assessment, environmental impact assessment and management.

Program Details

- Environmental Chemistry and Laboratory
- Solid waste Management
- Air Pollution Engineering and Management
- Wastewater Treatment
- Environmental Impact Assessment
- Waste Abatement and Management
- Environmental Quality Management
- Design of Air Pollution Control Systems

Course outline:

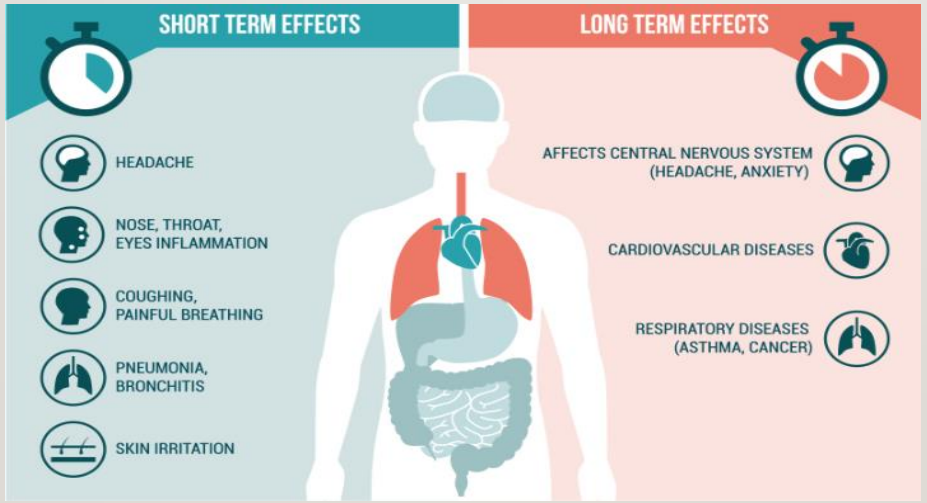
- Conduct sampling and analyze physico-chemical properties and characteristics of water, wastewater, air pollutants and solid wastes

Course outline:

- Sources, Generation and Characterization of Solid waste,
- Collection and Transportation
- Processing and Transformation of Solid Waste,
- Biological and Chemical Decomposition of Solid Waste (Aerobic and anaerobic processes,), Waste to Energy Processing Technologies,
- Reduce, Reuse, Recycling (3R) and Life Cycle Assessment of Waste Management Systems
- Sanitary Landfill

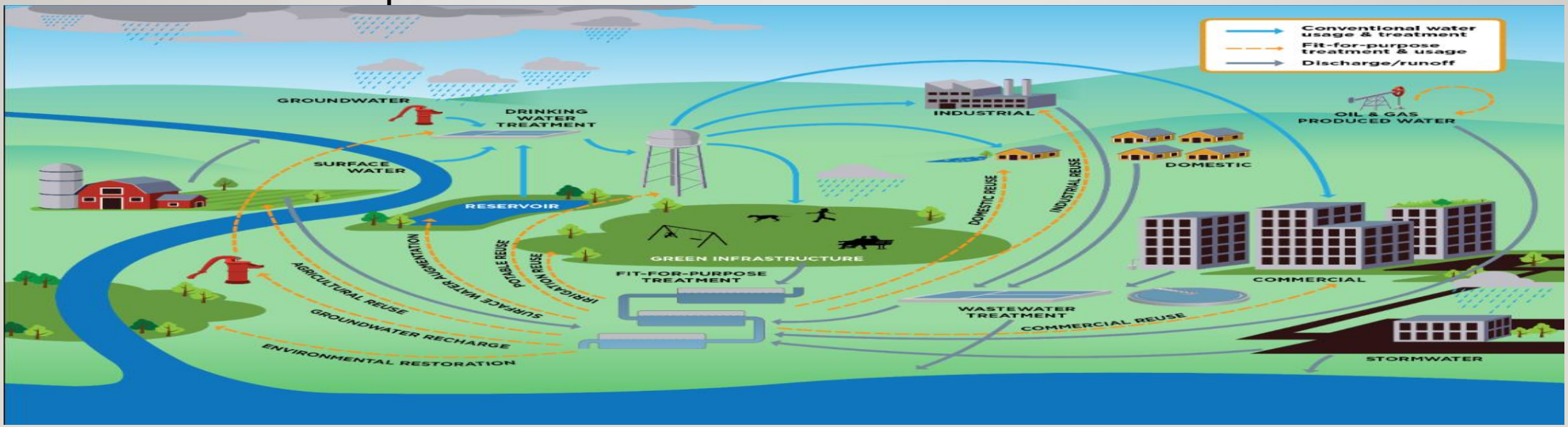
Course outline :

- Equip learners with scientific basis and engineering knowledge to understand the complexity of the air pollution problems
- Multiple effects of air pollution, and principal tools for effective integrated air quality management.



Course outline:

- to provide theoretical knowledge and practical application of various processes employed in wastewater treatment, and how to design these treatment processes.
- operation and maintenance methods as well as the troubleshooting techniques used in the various wastewater treatment processes.



Course Title: Environmental Quality Management

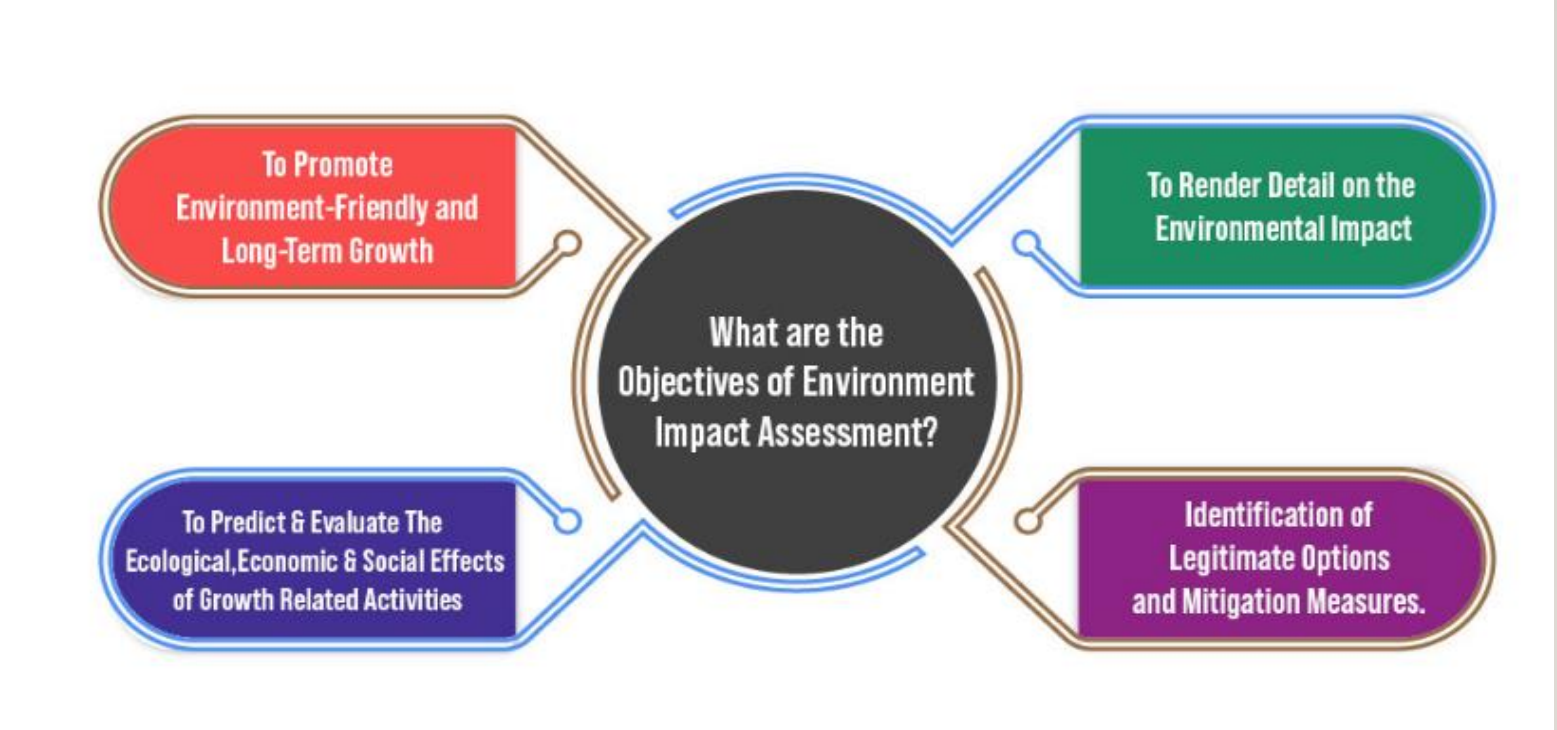
Course outline:

- How the natural environmental systems operate?
- How anthropogenic influence has affected the environment?
- Methods and principles in management of environment.
- Introduces various efforts and policies at national, regional and global level for maintain environmental quality

Course Title: Environmental Impact Assessment

Course outline:

- **C**onsolidates the understanding of EIA as a useful tool in environmental decision-making process, and
- In management of development projects



Course Title: Industrial Waste Abatement and Management

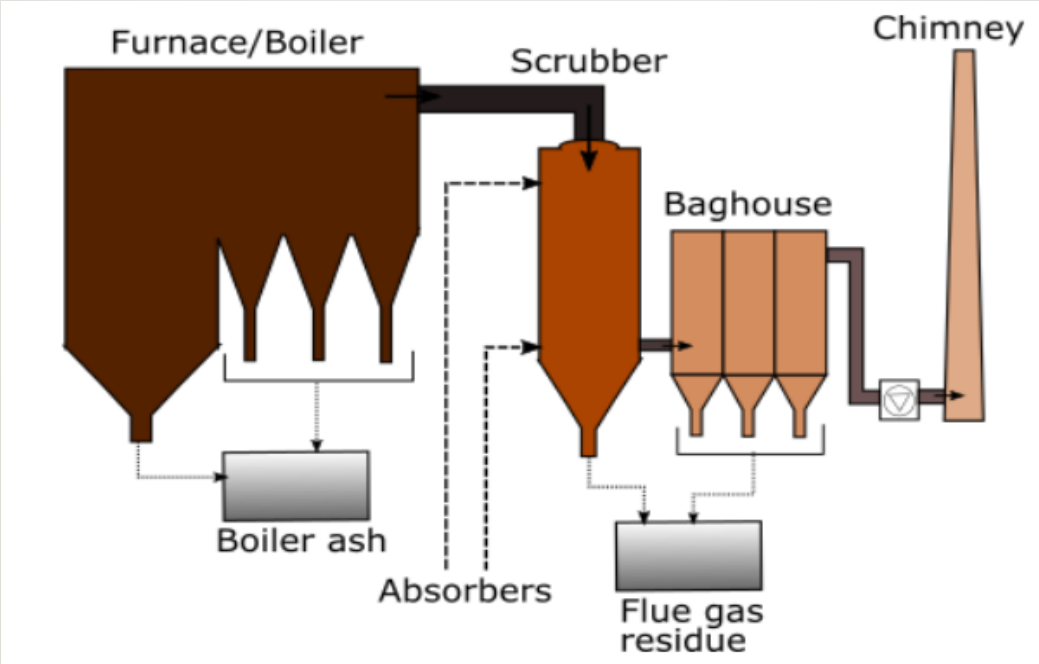
Course outline :

- Theoretical and practical skills to characterize, interpret and conduct waste abatement activities in an industrial environment.
- While integrated way of handling liquid, solid and gaseous emission from industries, greater emphasis are given to liquid pollution abatement and management.

Course Title: Design of Air Pollution Control Systems

Course outline :

- providing a combination of theoretical knowledge and practical applications of air pollution control techniques, enabling evaluation and selection of optimum control device/control system for a particular application..



Special Study

A CASE STUDY OF INDOOR AND OUTDOOR CONCENTRATION OF PM2.5 NEAR A WOOD AND REPAIR MAINTENANCE WORKSHOP AT THE OFFICE OF FACILITIES AND ASSET MANAGEMENT BUILDING IN AIT

Objective of the study

The objective of this study is to measure and compare indoor and outdoor PM2.5 concentration from a wood shop and other repair maintenance activities in the OFAM building in AIT

Particulate Matter

Particles described as particle size.

- Total suspended Particulates
- PM10
- PM2.5
- Ultrafine PM

PM emissions from different construction activities

- Equipment movement on unpaved surfaces.
- Earthwork cutting, filling and excavation activities.
- Loading, unloading, storage and material transfer activities.
- Drilling, crushing, screening, cutting, and surface cleaning activities.
- Clearing, demolition of existing structure
- Erosion of soil surface due to exposure by construction activities

Sampling Site

Monitoring Equipments

- **Sea-hazemon Sensor ，Nodedichotomous Air Sampler**

Operation Principle of Instruments

Parameter	Sampling Equipment	Sampling media	Principle/Analytic Method
$PM_{2.5}$	Sea-Hazemon Sensor	Online instrument	Using laser light to measure concentration
$PM_{2.5}$	BGI PQ200 Dichotomous Sampler	Manual instrument	Use gravimetric method to measure concentration

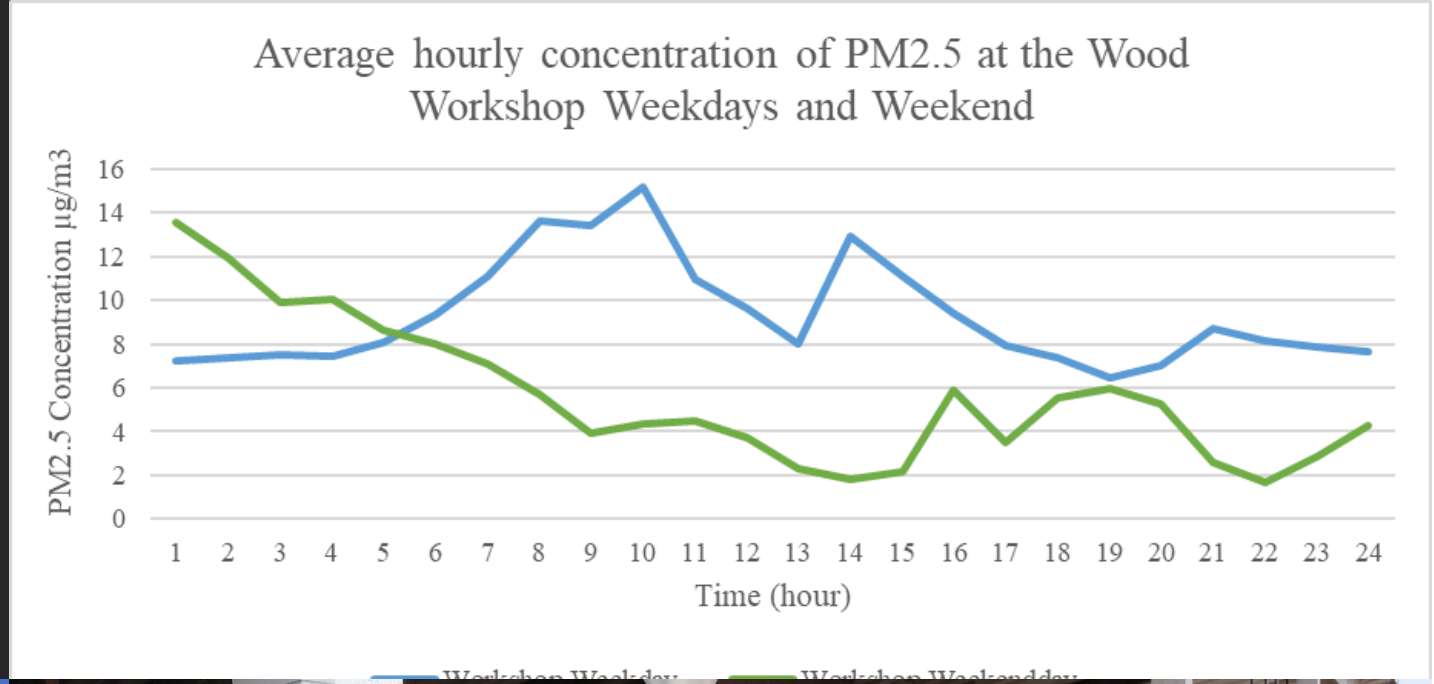
Sampling plan

- Sensors were installed at 3 locations (one sensor at each location) which are:
- Outdoor location inside OFAM area
- Workshop area
- OFAM office

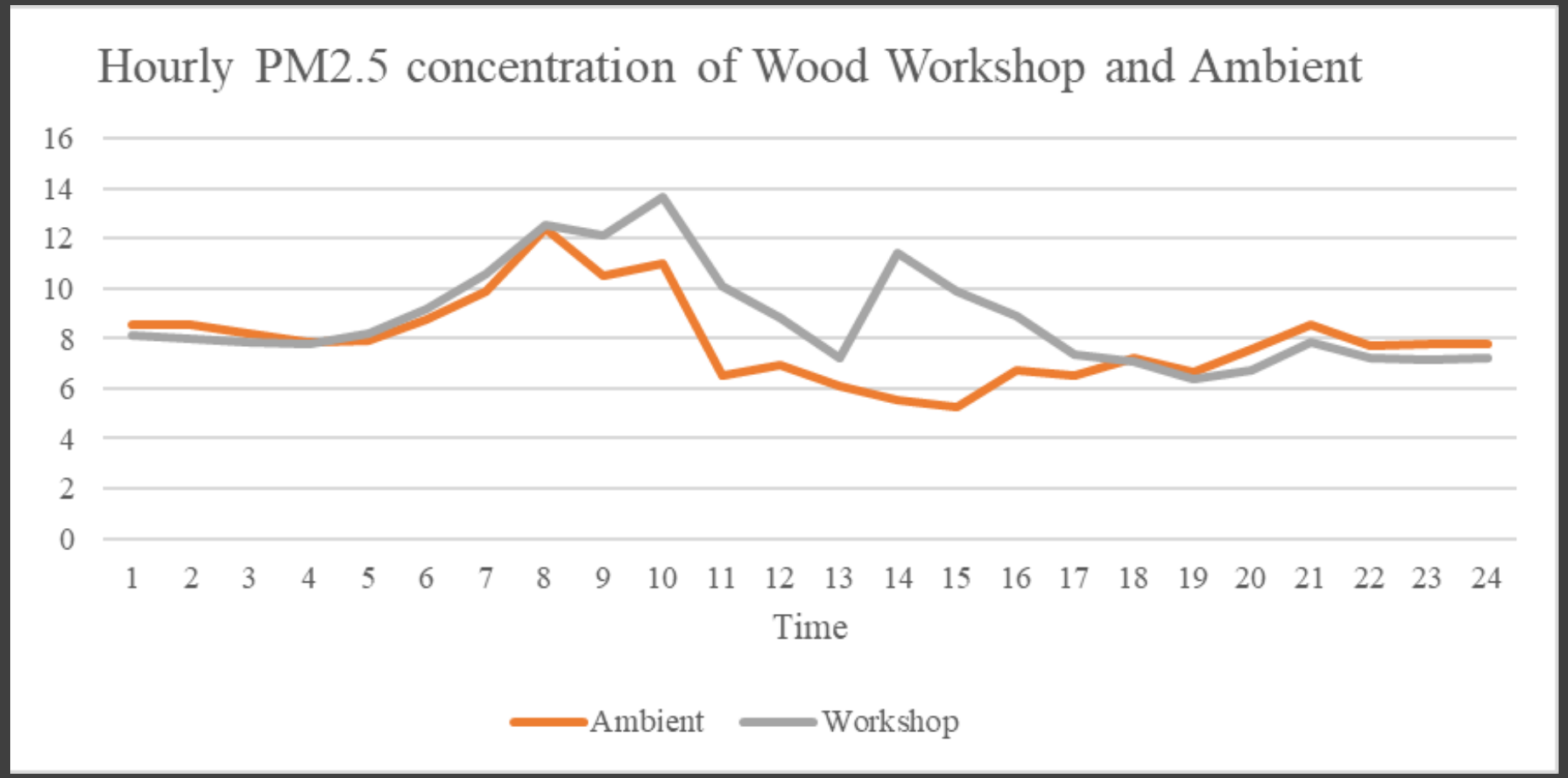
Sampling duration: Three weeks during 9 June to 30 June 2022.

- The dichotomous air sampler was placed at different locations for 3 days (Two weekday and another one weekend) to compare between the data form the dichotomous (standard method) and the sensor

Results and Discussion

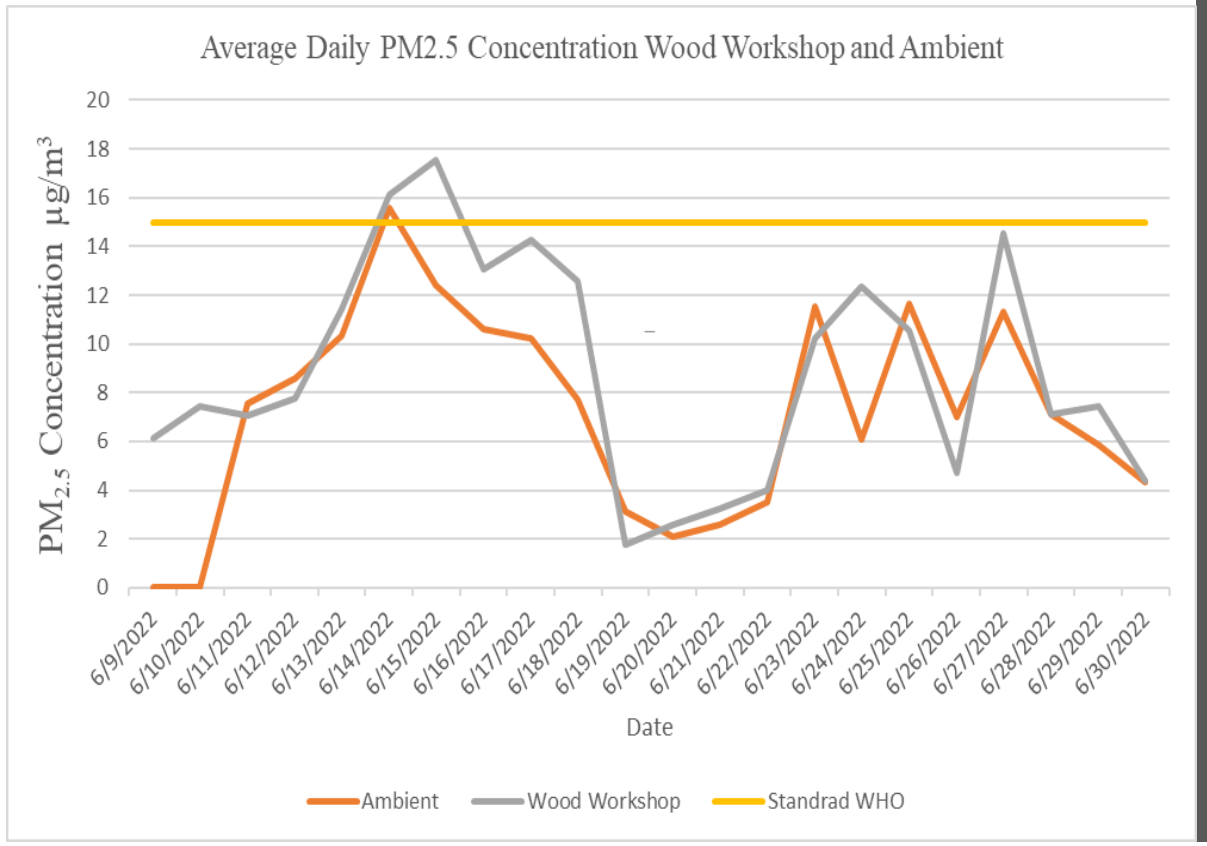


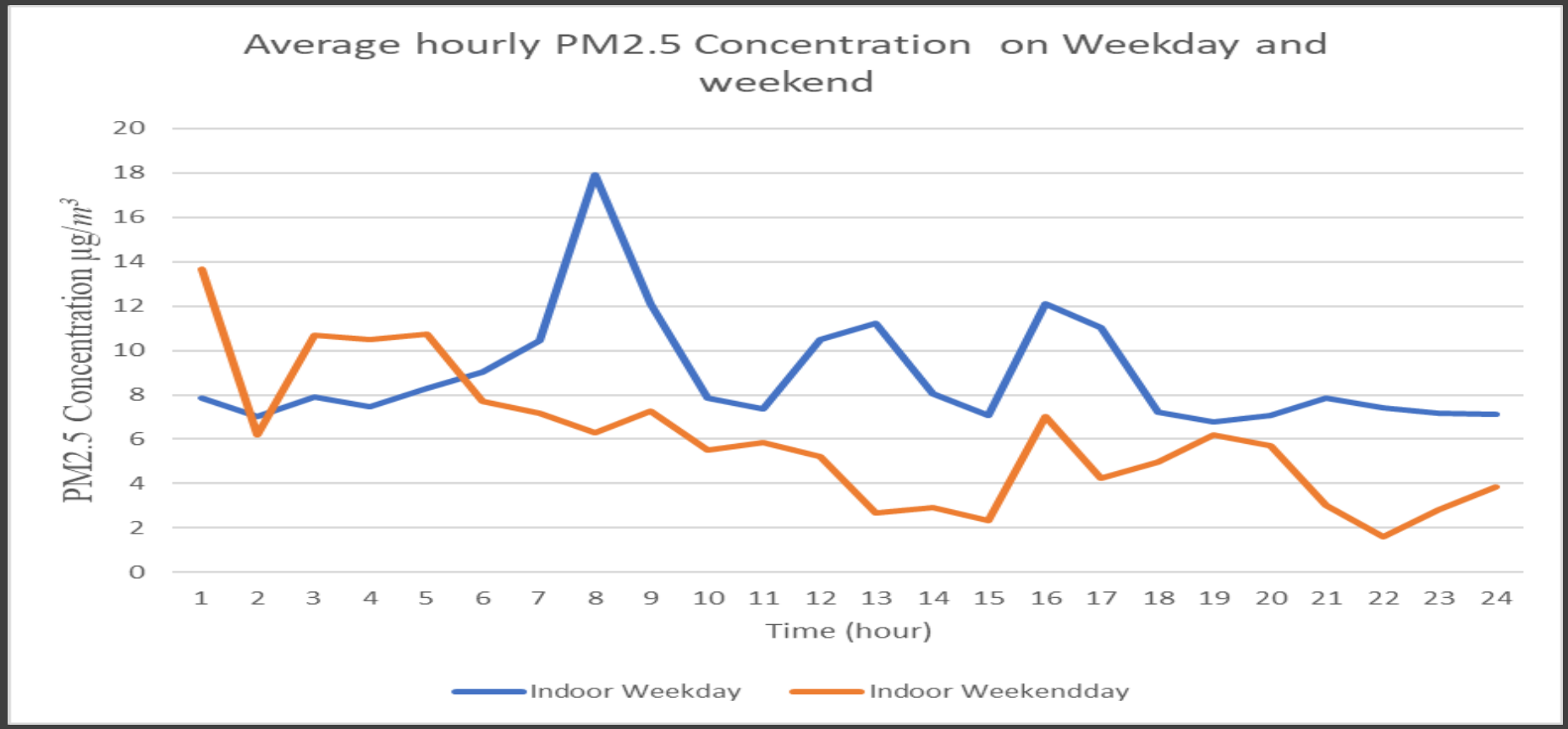
Average hourly concentration of PM2.5 at the Wood Workshop during weekdays and weekends.



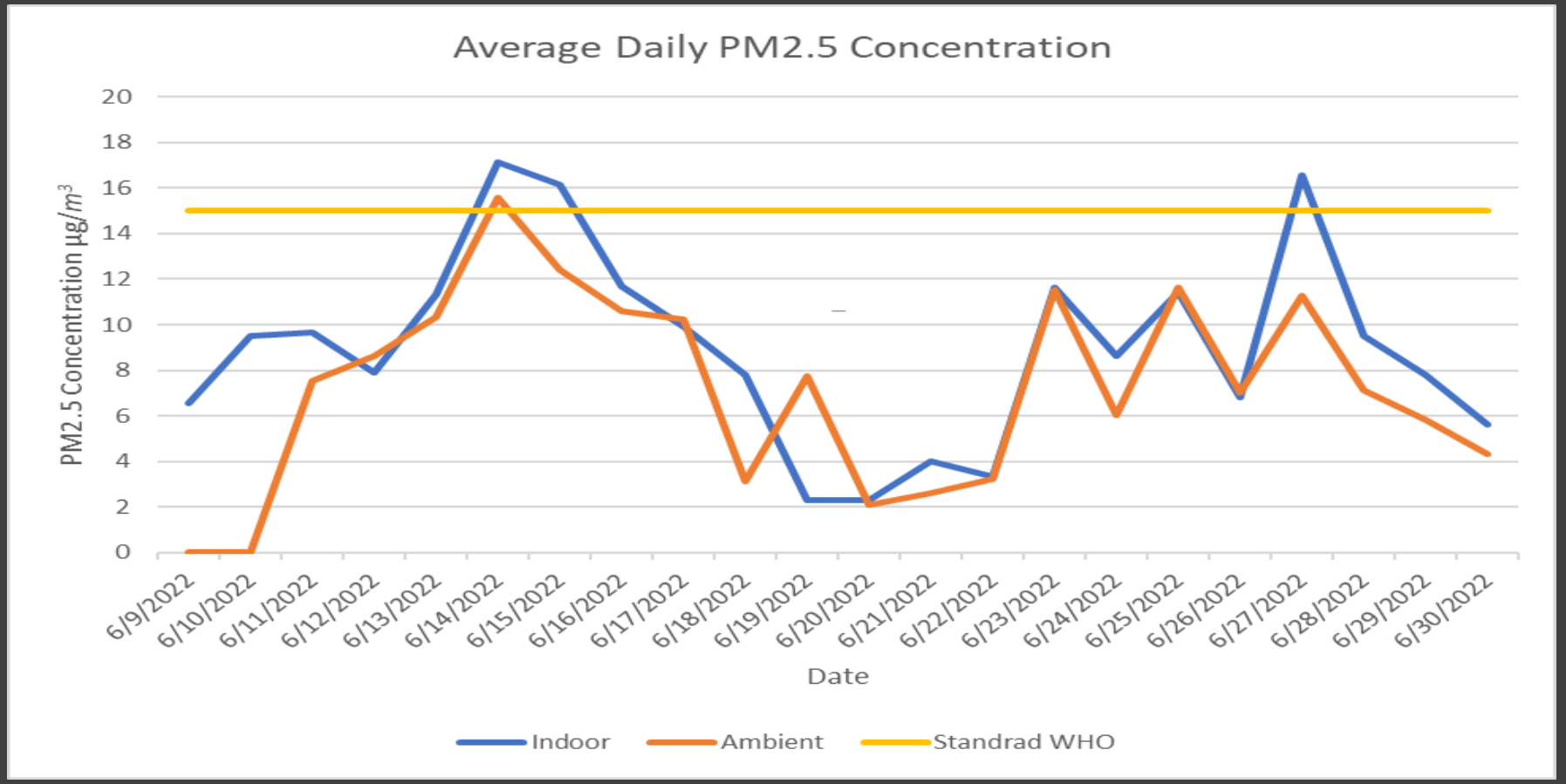
- Average hourly concentration of PM2.5 Near a Wood Workshop and Ambient

Average Daily concentration of PM2.5 Near a Wood Workshop and Ambient

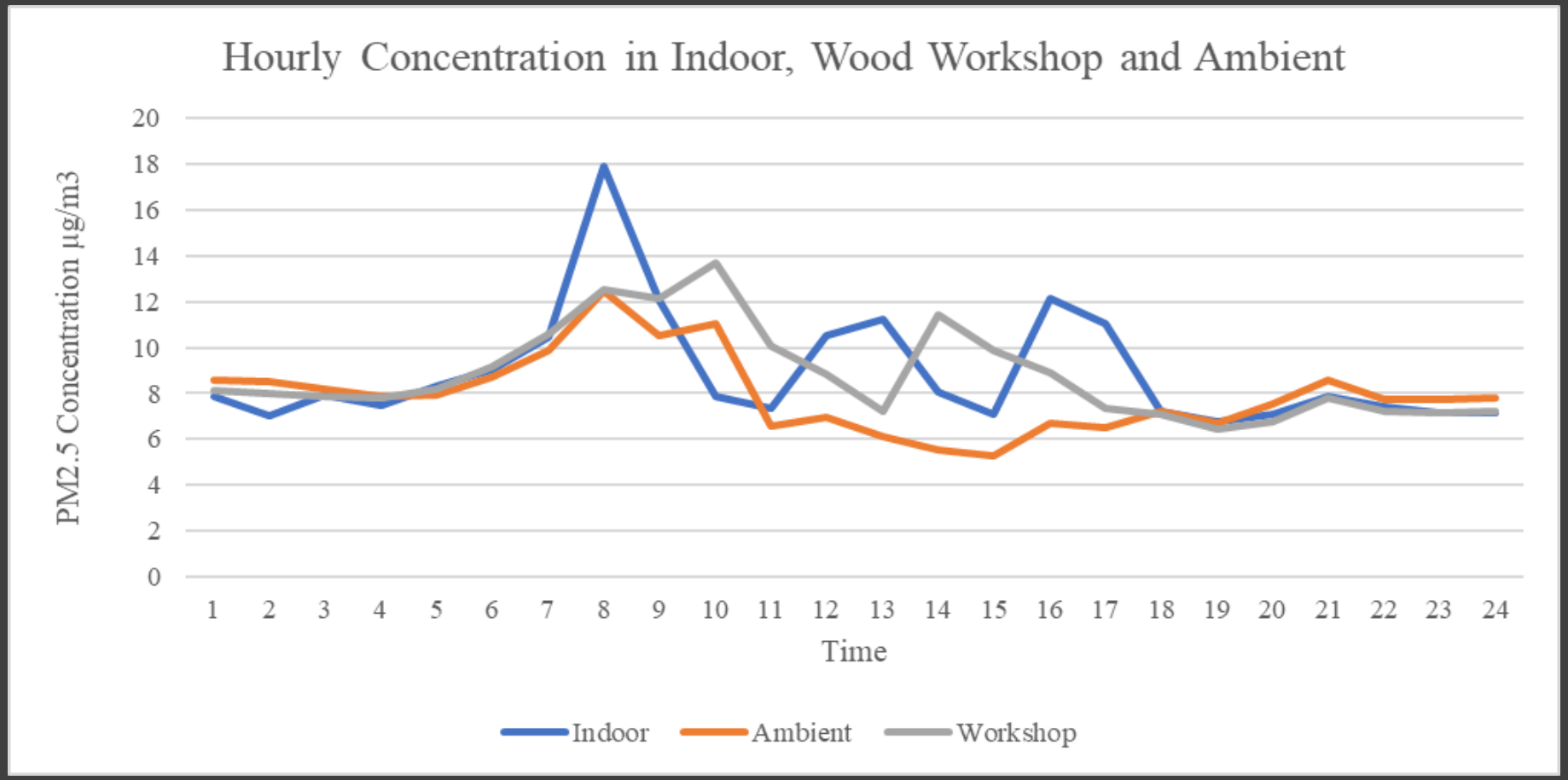




Average hourly concentration of PM2.5 in on weekdays and weekend days at indoor.

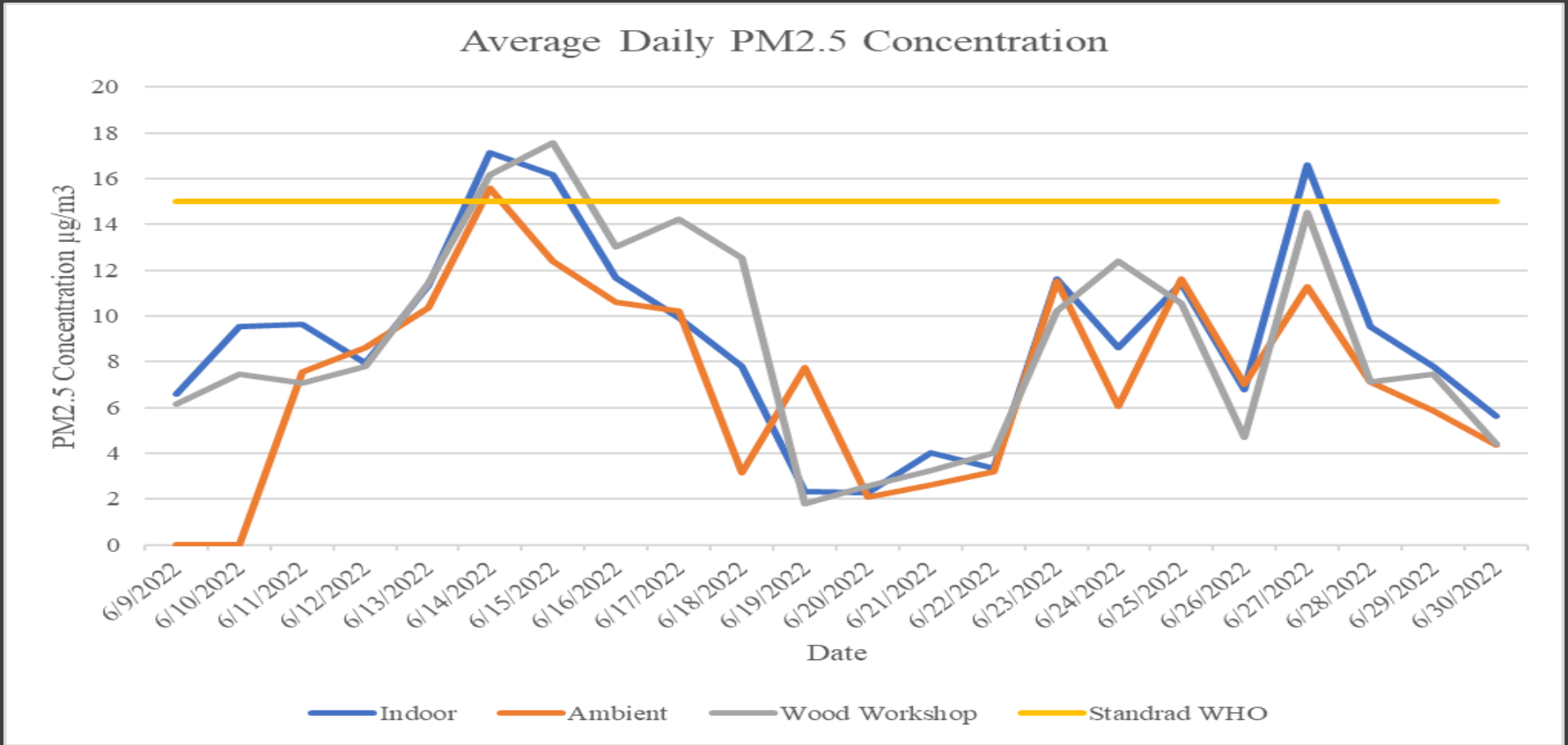


Average Daily concentration of PM2.5 at indoor and Ambient position during theSampling period



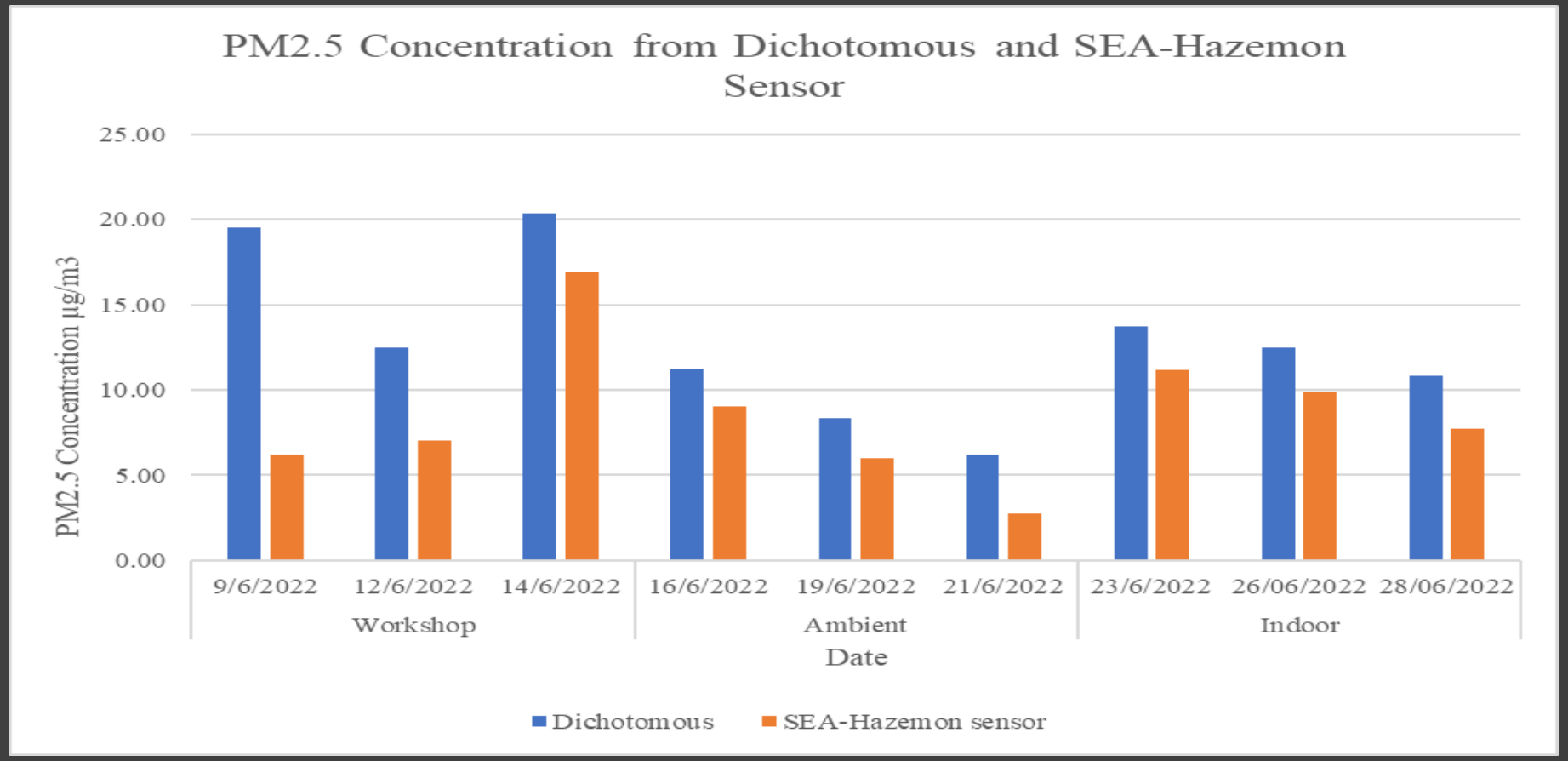
Average hourly concentration of PM2.5 in an indoor, wood workshop and ambient position

- Concentration of PM2.5 at Wood workshop area is relatively higher than ambient and Indoor.



Average daily concentration of PM2.5 in indoor, near a wood workshop and ambient position

- In holidays and less activity days the concentration had same trend



- PM2.5 concentration comparison between Two type devices

Concentration obtained from gravimetric method were found higher than the sensor for the same time.

Weekdays PM2.5 concentration higher than Weekend days

Working time concentration

higher than break or no activity time

- Can be beneficial for monitoring air pollution in the similar condition .
- Improving ventilation is the best way to improve indoor air quality.
- Best Quality raw material should used.
- Door opening should be fully opened during the working period
- Training can be organized to improve skills lead to reduced furniture finish usage and exposure for workers

Future studies

Further study with larger sample duration and size could certainly enhance both the quality and quantity of the data..

To improve research accuracy two sets of instruments must be used simultaneously for both indoor and outdoor measurement for longer duration.

Scope of Contributing to the LGED

- Environmental Impact Assessment (EIA)
- Solid Waste Management
- Fecal Sludge Management (FSM)
- Well-planned Land Fill construction
- Wastewater treatment in urban area.
- Policy Formation in Reducing Air Pollution

Thank You All