

様式 A-1  
(FY2023)

2023年 11月 14日

## サイエンス・ダイアログ 実施報告書

1. 学校名・実施責任者氏名: 広島県立広島国泰寺高等学校・森崎 将彦
2. 講師氏名: 広島大学 大学院先進理工系科学研究科 Dr. Mohammed MESTAR (Mr.)
3. 講義補助者氏名: 西宮 航(広島大学大学院)
4. 実施日時: 2023年 10月 27日(金) 13:40 ~ 15:30
5. 参加生徒: 2年生 77人、 1年生 人、 3年生 人(合計 人)  
備考: 普通科理数コースの生徒
6. 講義題目: Kinematic and mechanical behavior of Cross Laminated Timber (CLT) shearwalls with openings
7. 講義概要:

Analyses of CLT (Cross Laminated Timber) structures are performed using detailed numerical models (2D or 3D). A tremendous task is required for modelling as well as for postprocessing not to mention the required numerical capabilities of the computers used for these purposes. In this paper, an analytical model using energy principles is proposed in order to investigate mainly the influence of geometrical dimensions of the lintel, wall segments and the mechanical behaviour of hold-down on the elastic response of the wall assembly. The present study investigates 2 different kinematic modes depending on the dimensions of the lintel-beam in general. Mode-1, corresponding to a stocky lintel-beam, where one centre of rotation (1 CoR) characterises the behaviour of the wall, and Mode-2, corresponding to a slender lintel-beam, where the behaviour of the wall comprises two centres of rotation (2 CoRs). This research study refers to a previous contribution where the so-called kinematic modes are described in detail [1]. The mathematical model is applied to practical hold-down configurations where the two kinematic modes described above can be achieved. The current study addresses the case of door openings supposed to be centrally placed inside the wall. The analytical models are compared to detailed numerical models and reasonable results are found.

8. 講義形式:  
対面 ・ オンライン (どちらか選択ください。)
  - 1) 講義時間 80分 質疑応答時間 20分
  - 2) 講義方法 (例: プロジェクター使用による講義、実験・実習の有無など)  
プロジェクター使用による講義、建物モデルを用いた観察実験
  - 3) 事前学習  
有 ・ 無 (どちらかに○をしてください。)  
使用教材 講師の先生から事前にいただいた研究の概要・キーワードリスト, 学校作成のスプレッドシート
9. その他特筆すべき事項:  
特にありません。英語の苦手な生徒でも興味を持って学んでいました。貴重な機会をいただきありがとうございました。

Form B-2  
(FY2023)  
Must be typed

Date (日付)  
15/11/2023 (Date/Month/Year: 日/月/年)

**Activity Report -Science Dialogue Program-**  
(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): Mestar Mohammed (ID No. P22728 )

- Name and title of the accompanying person (講義補助者の職・氏名)  
Nishimiya Wataru

- Participating school (学校名): Hiroshima Kokutaiji High School

- Date (実施日時): 27/10/2023 (Date/Month/Year: 日/月/年)

- Lecture title (講義題目):  
Kinematic and mechanical behaviour of Cross Laminated timber (CLT) shearwalls with openings

- Lecture format (講義形式):

◆  Onsite ・  Online (Please choose one.)(対面 ・ オンライン)((どちらか選択ください。))

◆ Lecture time (講義時間) 120 min (分), Q&A time (質疑応答時間) 30 min (分)

◆ Lecture style (ex.: used projector, conducted experiments)

(講義方法 (例: プロジェクター使用による講義、実験・実習の有無など))

I used projection and conducted experiments

- Lecture summary (講義概要): Please summarize your lecture within 200-500 words.

Analyses of CLT structures are performed using detailed numerical models. A tremendous task is required for modelling as well as for post-processing. An analytical model using energy principles is used to investigate the influence of geometrical dimensions of the lintel, wall segments and the mechanical behaviour of hold-down on the elastic response of the wall. The study investigates 2 different kinematic modes depending on the dimensions of the lintel-beam in general. Mode-1, corresponding to a stocky lintel-beam, where one centre of rotation characterises the behaviour of the wall, and Mode-2, corresponding to a slender lintel-beam, where the behaviour of the wall comprises two centres of rotation. The mathematical model is applied to practical hold-down configurations where the two kinematic modes described above can be achieved. The analytical models are compared to detailed numerical models and reasonable results are found

◆ Other noteworthy information (その他特筆すべき事項):

.The work presented to the students is a first part of a comprehensive work. Additional presentations can be done in the future if needed

- Impressions and comments from the accompanying person (講義補助者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):

I think it was difficult for high school students to understand the research content. However, I think

it was a very good experience for the students in terms of getting them interested in English and

research. I also felt the need to learn English.

## Analysis: structural idealization

- Stresses and deformations

