

**2024 EARTH BUILDING CONFERENCE:
optimising earth walls for NatHERS 7 Stars**

FRIDAY 23 FEBRUARY 2023

TALKS ...hear from the earth builders

**5.00 REGISTRATION / LIGHT DINNER (1.5hr)
@ Hawkesbury EarthCare Centre**

6.30 Peter Hickson *EBAA PRESIDENT'S WELCOME*
Earth Building Solutions

6.50 Dr Jim Carfrae *Keynote: Thermal testing of
medium density Cob blocks to
comply with current NatHERS
ratings*
Environmental Building
Research Group, University
of Plymouth, UK (online)

8.05 AFTER DRINKS



We acknowledge the Traditional owners, the Boorooberongal People of the Darug Nation on whose unceded lands we are meeting. We acknowledge their frontier wars, their fallen warriors and their elders past present and emerging.

SATURDAY 24 FEBRUARY 2024
WORKSHOPS...making and creating

7.30 **BREAKFAST / REGISTRATION (1hr)**
@ The Secret Garden

8.30 **Peter Hickson** *Introduction: Achieving lower density values with earth materials*
Earth Building Solutions

9.15 **WORKSHOPS** CHOOSE ONE OR ROAM

**Rhiannon Morgan/
David Mitsak** *Cob Mud Fun: Musical Mudstomp*
Mud Fun

Ray Trappel *Unstabilised rammed earth*
Ray & Lynne Trappel
Architects

Kenney LeMire *Light Earth*
MudTec

Will Eastlake *Mud Bricks*
MudTec

11.00 **MORNING TEA (30min)**

11.30 **WORKSHOPS** *(continued)*

1.00 **REFRESH / Relocate to EarthCare Centre (30min)**

1.30 **LUNCH (1.5 Hrs)**
@ EarthCare Centre



SATURDAY 24 FEB (continued)
TALKS ...hear from the earth builders

3.00 **Marci Webster-Mannison**
Melbourne Design Studios
NCC Update: Passive Low Energy assessment

3.15 **Peter Hickson**
Earth Building Solutions
Lower density values: Meeting the new energy efficiency requirements

3.45 QUESTIONS

4.00 AFTERNOON TEA (30min)

4.30 **Verena Maeder**
Solid Earth Adobe Buildings, NZ (online)
Adobe Innovation: Structural low-density adobe for temperate climates

4.55 QUESTIONS

5.10 **Ryan Strating**
Clinka (online)
Lightweight expanded clay aggregate: Increasing the thermal ratings of earth walls

5.35 QUESTIONS

**5.50 DRINKS followed by
EBAA ANNUAL CONFERENCE DINNER @ 6.30**

8.00 Music Fun – bring your instrument



SUNDAY 25 FEBRUARY 2024
EBAA AGM, 5x5's & SITE VISIT

7.30 BREAKFAST / CHECKOUT (Checkout closes 1pm)
@ EarthCare Centre

9.00 EBAA ANNUAL GENERAL MEETING

10.30 MORNING TEA (30min)

11.00 5X5's *5 slides in 5min*
Sign-up prior with Ray

12.00 LUNCH / Into to Site Visit (1.5hr)

SITE VISIT...see with your own eyes

1.30 SITE VISIT *Depart for Cranebrook (20min approx)*

2.00 Cranebrook *Unstabilised rammed earth house*

3.00 CLOSE *Safe journey home.*



PRESENTERS...the earth builders

Thermal testing of medium density Cob blocks to comply with current NatHERS ratings

In the UK and Australia it is proving more difficult to build with earth because of the way that the thermal performance of building materials is measured. In Australia the more traditional forms of Earth construction struggle to comply with current NatHERS ratings.

The Environmental Building Research Group at the University of Plymouth have been working on the optimization of Cob construction in order to comply with the current UK building regulations. The EBAA became involved in this work as we had a common objective and requested tests on a series of medium density cob blocks in order to ascertain their suitability under the Australian thermal regulations.

This presentation will look at the relationship between fibre content and density for a range of cob mixes, discuss the measurement of thermal conductivity and look at the often disregarded role of Specific Heat Capacity (Thermal Mass).



Dr Jim Carfrae, Research Fellow, Environmental Building Research Group, University of Plymouth, UK.

Jim.carfrae@plymouth.ac.uk



Dr Jim Carfrae is currently a research fellow and lecturer at the University of Plymouth.

Jim's expertise is in the thermal and moisture performance of natural building materials particularly earth and straw-bale. He has a special interest in quantifying and reducing the embodied energy in buildings.



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PRESENTERS...the earth builders

Introduction: Achieving lower density values with earth materials

Medium-density earthen buildings with firestorm-resistant windows, doors, roofs, utilities, and high-efficiency sprinklers/ misters could mitigate the emerging hazard of entire, modern cities burning from their high architectural fuel load, as high-flow interior sprinkler connections to burned homes drain water systems. Includes selected granular detail.



Peter Hickson, Earth Building Solutions, Director, NSW Australia & President, Earth Building Association of Australia

<http://earthbuildingsolutions.com.au/>
peterhickson@earthbuildingsolutions.com.au



Peter Hickson is a professional builder and one of Australia's leading proponents of earth building. He has been actively engaged in earth building for over 42 years, in design and construction as well as in writing, education, research, promotion, leadership, community development and aid work. Peter has developed construction systems and commercial mud brick making equipment. A foundation member of the Earth Building Association of Australia (EBAA), serving on the committee since 2000 and as president for ten years. Peter's business, Earth Building Solutions, offers services such as building, training and consultancy.



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Mud Fun: Musical Mud Stomping

Mud Fun facilitators will fully engage everyone for the duration of the conference - workshopping the musical mud stomp which culminates with an interactive presentation at the end where youth take on key roles.



David Mitsak, poet/artist, Mud Fun Australia

mitsak.ratsack.david@gmail.com

Rhiannon Morgan, architect/musician, Mud Fun Australia

rhiannonmorgan44@gmail.com



David Mitsak and Rhiannon Morgan have been holding the vision for the Mud Fun approach to earthen building which hinges on teamwork, strength in numbers and a festive spirit invoked by music and the cultural arts to. The program has reached over 16,000 individuals mostly young people and their families with funding from government grants allocated for community engagement and wellbeing.

Recently Mud Fun has been exploring how the Mud Fun way can work on private property to deliver both social goals and shelter goals together. Our definition of shelter includes a livable cubby house inspired by van life and the tiny house movement.



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Unstabilised Rammed Earth Workshop

How to make something from nothing? This workshop will make an unstabilised rammed earth wall. The building material is unstabilised because no cement is added to the mixture.



Ray Trappel, architect & builder

Ray & Lynne Trappel Architects, NSW Australia

raytrappel@inet.net.au

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Ray has been involved in earth building for over forty-five years and is an active member of the Earth Building Association of Australia. He has devoted his time to many community projects – his most recent, The New Secret Garden and Tiny House at Western Sydney University, Hawkesbury.



<https://www.hawkesburygazette.com.au/story/4624905/autumn-fair-at-new-secret-garden/>

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Light Straw Clay / Light Earth Workshop

Light straw clay (light earth) is an insulative wall infill made from tamping loose straw, coated in clay slip (milky clay), into formwork around or between a wall frame. The process is much like hempcrete, but uses straw rather than hemp and clay instead of lime binder.

In this workshop we will show the process, blending clay slip and getting the correct viscosity; using a straw tumbler to mix the straw and clay slip and getting the right coating. We will then tamp into a sample frame to see the results and discuss tamping pressure to achieve the desired density.

We will talk about the pros and cons of the material and things to look out for during construction.



Kenney LeMire, Director (B Arch, B ApSc Env Des)

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Kenney has an Applied Science degree in Environmental Design and a Bachelor of Architecture. After graduation, worked in Canberra for a leading architecture practice for 5 years.

In 2013, Kenney partnered with Will Eastlake at Integrated Biotechure Design (IBD), teaching natural building workshops, and designing natural systems and sustainable homes. Kenney and Will created Mudtec in 2019, manufacturing compressed earth bricks and providing natural building services, with IBD focused on building design.

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Mudbrick Workshop

Mudbricks have been used in construction for over 10 000yrs. Using a mixture of clay, sand, water and chopped straw, these sun-dried bricks are still a good way of using local materials to create a hand-made home.

In this workshop we will show the process of making brick forms, creating the right mud mix and producing sample bricks.

We will talk about the pros and cons of the material and things to look out for during construction. The difference between mudbricks (puddled bricks) and compressed earth bricks.



Will Eastlake, Director (M Arch, B ApSc Env Des)

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Having an Applied Science degree in Environmental Design and a Master of Architecture, Will worked for Indigenous Business Australia designing remote indigenous housing. This led Will to a co-manager role at the Puna Project, a permaculture and natural building education centre in Thailand.

Will then started Integrated Biotechture Design (IBD), teaching natural building workshops, and designing natural systems and sustainable homes. Will and Kenney founded Mudtec in 2019, manufacturing compressed earth bricks and providing natural building services, with IBD remaining focused on building design.

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NCC Update: Passive Low Energy assessment

In a misguided attempt to improve the thermal performance of new homes, the National Construction Code was updated in 2022 to include new NatHERS climate files, and to increase the minimum rating for new dwellings to NatHERS 7-star.

This short update will highlight some of the problems with the NCC 2022 including outdated climate files, dangers of the assumed reliance on air conditioning and future-proofing of homes for a warming climate, and the need for an assessment pathway for passive low energy homes.



Marci Webster-Mannison, Head of MDS,
Queensland & NSW

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<https://melbournedesignstudios.com.au>

Marci is an ecologically-inspired architect from Melbourne Design Studios (MDS). Marci was the lead architect for the rammed earth buildings of Charles Sturt University (the largest complex of earth buildings in Australia) which are designed for solar access, daylight and solar energy, earth thermal exchange, night cooling and natural ventilation to suit the desert climate.



Photo: Patrick Bingham-Hall

PRESENTERS...the earth builders

Adobe Innovation: Structural Low-density Adobe for Temperate Climates

Adobe construction is typically associated with hot and dry climates and there is valid concern about its thermal performance in temperate climates. In this presentation Verena shares about the development of low-density Adobe blocks for load-bearing wall systems, which have much better insulation values, as well as the field research conducted over the past 15 years that has resulted in the integration of this technique into the internationally acclaimed NZ earth building standards.



Verena Maeder, Solid Earth Adobe Buildings Ltd,
New Zealand and Earthbuilding School

www.solidearth.co.nz
www.earthbuildingschool.com

Verena is an artisan with 32 years experience in the construction of earthen buildings. She operates an Adobe brick manufacture in New Zealand, and has to date carried out 200+ building projects. Verena is currently part of the committee in charge of the revision of the NZ Earth Building Standards.



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Clinka lightweight expanded clay aggregates in Rammed Earth

The thermal performance of massive materials like rammed earth is improved by adding micro pockets of trapped air in the wall build-up by means of insulating products. The most common method to date involves installing a central XPS board with panels either side. A simplified option to this has been developed which uses *clinka* expanded clay aggregates throughout the rammed earth mix.

Clinka ECA is popped clay, with a high strength-to-weight ratio. These ceramic particles have internal pore volumes that add trap air within the cementitious matrix. This slows energy transfer through the wall, increasing thermal performance in cold and hot climates.

The presentation is a brief history of low-density concretes and a recent case study using *clinka* expanded clay aggregates (ECA) and other recycled aggregates to create low-density concrete / modified rammed earth to improve residential thermal performance >7 stars, and provide a healthy indoor climate for building occupants.



Ryan Strating, Director of *clinka*

clinka.com.au

Ryan Strating is a director and technical adviser for building materials company *clinka* - distributing expanded clay aggregate products to the Australian construction industry; and also founding director of *Core Collective Architects* whose award-winning projects use established and innovative techniques to create robust and highly thermally efficient homes.

Photos: Adam Gibson

