

ARCHITECTURAL ASSOCIATION  
SCHOOL OF ARCHITECTURE  
VISITING SCHOOL

ASIA  
MYANMAR



ARCHITECTURAL ASSOCIATION SCHOOL OF ARCHITECTURE  
**MYANMAR VISITING SCHOOL**  
PART OF THE AA BAMBOOLAB PROGRAMME

[myanmar.aaschool.ac.uk](http://myanmar.aaschool.ac.uk)

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# CUTTING EDGE BAMBOO RESEARCH

## AA MYANMAR VISITING SCHOOL (AA BAMBOO LAB) THE AA SCHOOL

The Architectural Association (AA) is London's oldest school of architecture and educational charity, originally established in 1847. What makes the AA so unique is found in the demand it places on teachers as well as students, to clearly communicate the larger cultural, social and environmental agendas facing our planet, and consequently where architecture should endeavour. The hallmark of this model is the delivery of distinctive, highly focused design agendas concentrated around a small collaborative group of students, architects and other creative people in the development of projects.

All tutors on the AA Myanmar Visiting School represent the Architectural Association School of Architecture,

which as an independent School of Architecture is bound by certain principals to maintain its status as a charity in England and Wales.

The Architectural Association, Inc. is a Registered Charity Incorporated as a Company limited by guarantee. Registered in England No.171402.

The Association's principal activity is the operation of a school of architecture and a learned society. The primary object of the Association, as stated in its Memorandum of Association is 'for the public benefit to promote and afford facilities for the study of Architecture ...'

The **AA Bamboo Lab** is a global autotelic research programme of the AA Visiting School which explores the fusion of highly advanced computational design software and sustainable natural lightweight materials, to spawn new architectural opportunities. This design and construction laboratory looks at the application of these new syntheses beyond architecture, to ecological restoration, social development, material infrastructure and the latent creativity these global challenges provide.

# WHY MYANMAR?

THERE IS A PRESSING NEED FOR DECENT SHELTER, CLINICS, SCHOOLS, AS WELL AS VOCATIONAL AND COMMUNITY CENTRES, PARTICULARLY IN RURAL COMMUNITIES.

**A FUNDAMENTAL DEVELOPMENT CHALLENGE** in Myanmar, a country directly comparable to Thailand in terms of physical size and population, is a nationwide deficit of infrastructure. Transport and power supply networks are limited, and the healthcare and education infrastructure has received minimal investment in the past 60 years. There is a pressing need for decent shelter, clinics, schools, as well as vocational and community centres, particularly in rural communities.

Meanwhile, Myanmar is the world's third largest producer of bamboo, with extensive bamboo groves throughout the country. Bamboo is widely utilized for daily utensils and implements, as well as temporary structures. However, in today's Myanmar, bamboo is not generally recognized as a permanent building material.

These considerations provide exciting opportunities for establishing the use of this abundant and readily available

resource as a key architectural contribution in the development of Myanmar.

At the first World Bamboo Day to be celebrated in Myanmar (September 2016), a profound conclusion among attendees was the deep interconnection between community forestry and bamboo. With its notably high proportion of the population (around 70%) living in rural and forest-based communities, this presents Myanmar with the potential to unleash widespread environmental, social and economic benefits as bamboo-related economic initiatives are developed.

BAMBOO PRESENTS MYANMAR WITH THE POTENTIAL TO UNLEASH WIDESPREAD ENVIRONMENTAL, SOCIAL AND ECONOMIC BENEFITS AS BAMBOO-RELATED ECONOMIC INITIATIVES ARE DEVELOPED.

## THE VISITING SCHOOL'S AIMS

Bamboo is sustainable and rapidly renewable, economically sound, beautiful and durable. Use of this versatile, disaster-resilient material is increasingly accepted by architects worldwide as having enormous environmental and socio-economic benefits.

## THE ARCHITECTURAL ASSOCIATION MYANMAR VISITING SCHOOL (AAMMVS) AIMS TO PROVIDE SPACE AND SUPPORT TO INVIGORATE THE ARCHITECTURAL USE OF MYANMAR'S ABUNDANT LOCAL BAMBOO RESOURCES.

The project will revitalize local, traditional bamboo use techniques, and where applicable, combine them with current international best practices in the use of bamboo. It will promote the application of bamboo as an environmentally sound, renewable, and practical means to increasing and sustaining local craftsmanship, sustainable livelihoods, cultural heritage, while supporting carbon sequestering and environmental protection in the region.

The AAMMVS, through innovative design and construction, will act as a rallying call to elevate the latent potential of bamboo by synthesizing cultural tradition and cutting edge architectural design and testing software. The project also aims to increase public perception and acceptance of bamboo as a mainstream, durable and versatile construction material that can be applied to a wide range of Myanmar's infrastructure needs.



# CUTTING EDGE RESEARCH WITH IMMEDIATE IMPACT

## THE SITE & LOCATION

The Visiting School will be located near Bago, a city of 5.5 million people, approximately a 1.5-hour drive from Yangon International airport, and two hours from downtown Yangon. Accommodation and training facilities will be provided at the Metta Bago Centre, a tranquil learning environment with unique arts & crafts buildings designed by one of the course leaders, local architect U Hla Thuang.

## THE PROJECT

The underlying brief of the AAMMVS will be to contribute to the design a small school of architecture, a real project, that will be located on a 3.5-acre site adjacent to the Metta Bago Centre.

This school of architecture, very much inspired by the pedagogical approach of the AA, will nurture creative Burmese architects. In this highly-underdeveloped country, the importance of innovation, critical thinking and good practical design solutions cannot be underestimated.

Students at this school of architecture will be guided in developing their awareness of the full range of the Architect's responsibilities, including cultural, economic, social and environmental agendas. It is planned that students will work on 'real world projects', using a project-based learning approach. To facilitate this approach, a professional architect's project office will be attached to the school.

Sustainability will be at the core of the proposed teaching program,

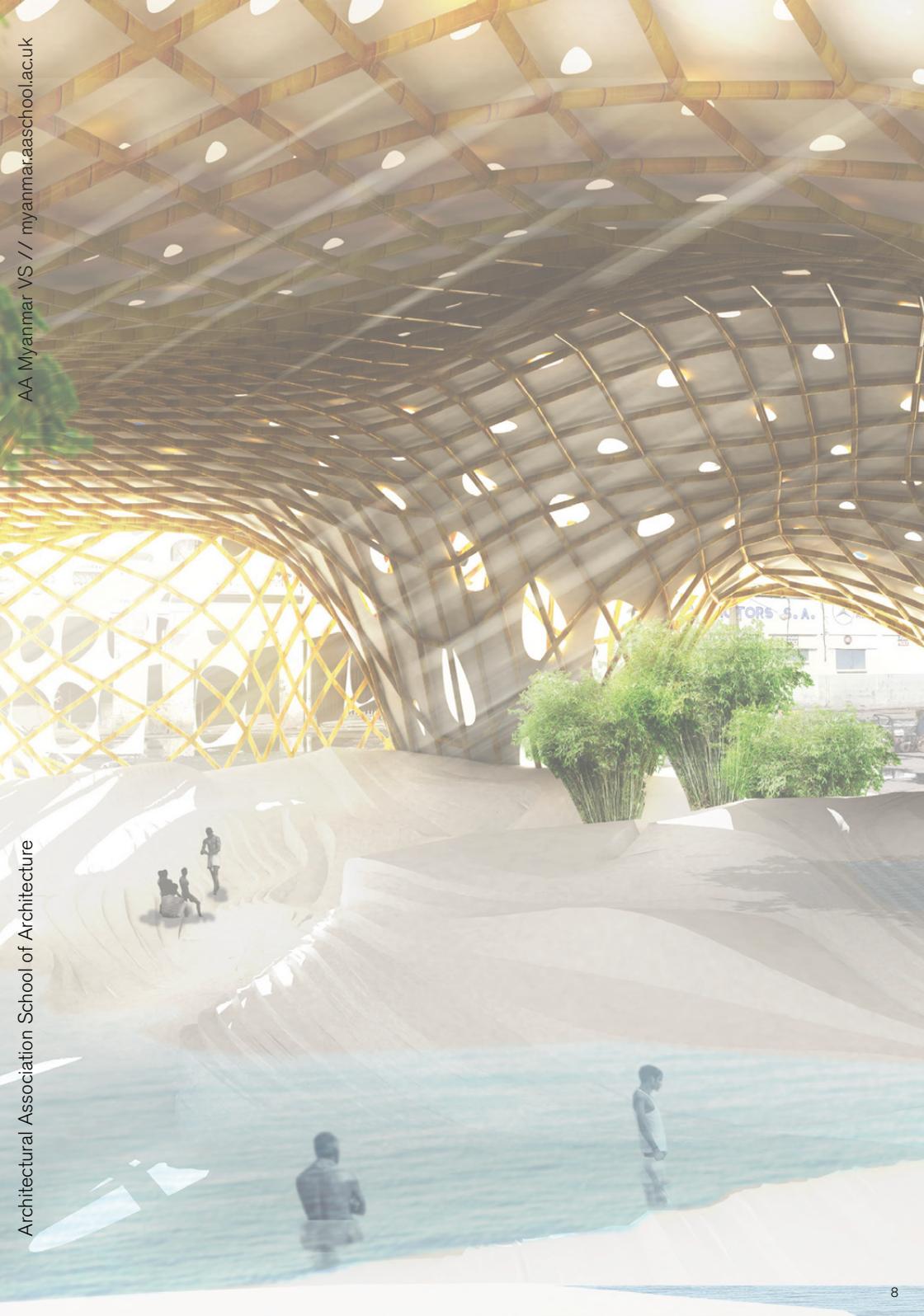
complimented by permaculture and other grassroots environmental training programs already being taught at the Metta Bago Centre. Naturally, bamboo will play an important role in the physical and cultural development of the school of architecture.

## OBJECTIVES OF THE COURSE

- Experimental design with bamboo.
- Development of Burmese architectural expression.
- Innovative bamboo connection details.
- Emphasis on practicality and replicability.
- Taxonomy, cutting and treatment.
- Computation design and testing process.

## COMMUNITY PARTICIPATION

An important part of these courses is the two-way knowledge transfer between overseas participants and the local community where we are working. This will be a magnet for debate, discourse and reimagining solutions to problems of the local built environment and ecology. Local bamboo carpenters and architecture students will be part and parcel of this course and this will create unique perspectives and experiences for overseas participants.



# WHY BAMBOO?

## SPEED OF GROWTH

Considered as a grass and as fast growing, giant bamboo, of which numerous species originate in Myanmar, can grow up to one meter per day. Bamboo typically grows 80 percent of its volume in the first three months. After this initial growth spurt, giant bamboo species can grow up to 30 metres tall.

## WATER ABSORPTION

One hectare of bamboo can absorb up to 30,000 litres of water during the monsoon season and deposit this slowly back into the soil. With landslides and river eutrophication being an all too common result of deforestation in Myanmar, bamboo has a highly significant environmental role to play.

## CARBON ABSORPTION

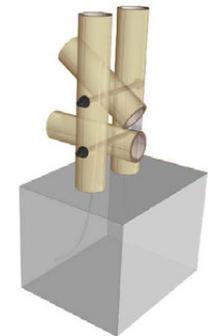
Bamboo can sequester more carbon than hard-wood. Given the global drive to curb carbon emissions through carbon offset schemes, if Myanmar were to start growing bamboo for construction, this could financially incentivise landowners to simultaneously re-forest and clean the atmosphere.

## A WIDE LOCAL VARIETY

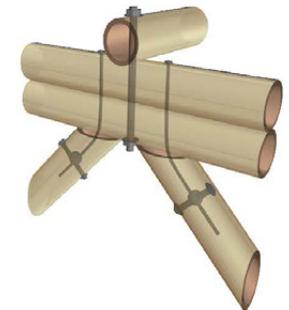
Myanmar has over 100 species of bamboo, the name in Burmese for bamboo being **'wa'**.

For construction the following species (local name/scientific name) are commonly used:

- Wa bogyi (*Dendrocalamus giganteus*)
- Thik-wa (*bambusa tulda*)
- Wanet (*bambusa vulgaris*)
- Ka-Lwai wa (*Dendrocalamus Asper*)
- Kyalo-wa (*Dendrocalamus brandisii*)
- Hmyin (*Dendrocalamus strictus*)
- Wabo-myetsangye (*Dendrocalamus hamiltonii*)



**Joint de Fondation**  
Foundation Connection



**Entretoisement**  
Bracing Connection

Image (and opposite): Student work from the AA Bamboo Lab Haiti, a sister course of the Myanmar VS

# JOIN US

## COURSE CURRICULUM

### Phase 1: Site mapping and bamboo model making (3 days)

We will begin by exploring the site in rural Myanmar proposed to be the future school of architecture. This will be an opportunity to understand the properties of the site and the needs of the end users.

#### This process will include:

- Lecture on the typology of the buildings to be created and the way they are intended to be used;
- Meeting with members of the organisation for which the structure will be built;
- Understanding the interaction with other nearby training facilities, including the potential for developing a centre of excellence for ecological design.

Following the initial site visit (the proximity between the proposed site and Metta Bago Centre allows participants to re-visit the site as often as they please), participants will rapidly develop their design proposals for part or all of the school, reflecting only their immediate conceptual responses to the site. The objective will be to rapidly progress this stage to creation of bamboo models. Bamboo has the fantastic ability to display the same material properties at many scales. As a result, bamboo model making has become an art in itself. Bamboo models offer material and structural information in real time as we endeavour to express initial intuitive responses to the site investigation.

### Phase 2: Bamboo material knowledge (1/2 day)

There will be intensive lectures on the material of bamboo, learning their characteristics as both a plant and a construction material. You will learn the difference between a pachymorph and a leptomorph and learn why you should not use green bamboo and why bigger is not always better. This will ensure the properties of bamboo as a construction material are embedded into the design work from the earliest stages, in order to synergise design intent with the material realities.

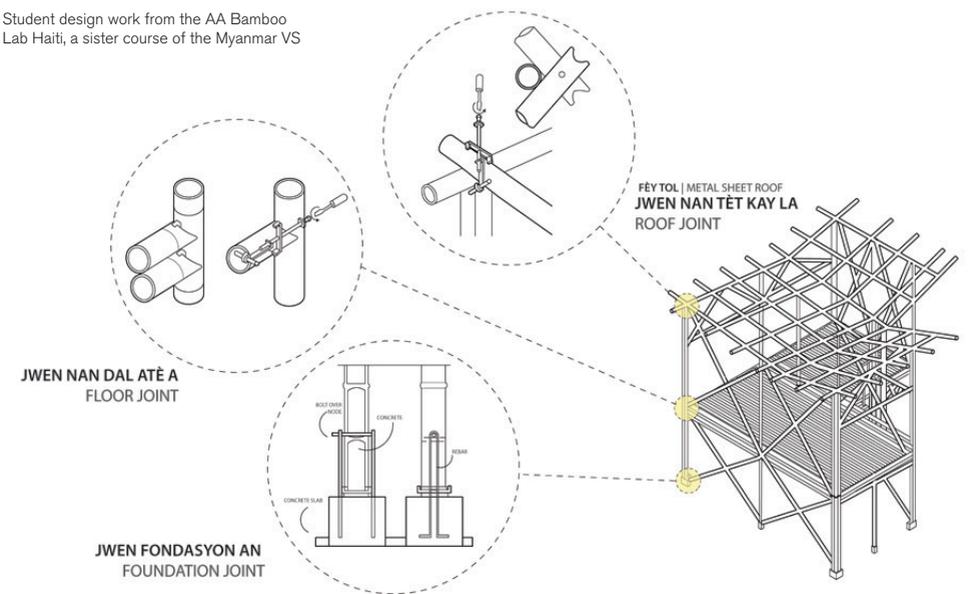
### Phase 3: 3D Modelling (1 day)

After our physical modelling investigations, we will take these models into the computer. We will use Rhinoceros 3D as our modelling tool to create a model which can be studied and developed to optimise the design.

### Phase 4: Generative Design and Computational Testing (1 day)

Following this, software such as Autodesk Flow and Karamba will be available as tools to assist with lines of inquiry emerging from the initial concept design process. These tools will allow designs to be subjected to various climate and aerodynamic profiles, allowing us to mitigate the effects of Myanmar's natural vulnerabilities. With class tutorials in presentation software such as Creative Suite we want all students at the end of the course to present a portfolio to a high standard. As tools for testing and conveying our

Student design work from the AA Bamboo Lab Haiti, a sister course of the Myanmar VS



ideas this vast palate of software tools will be taught from a position of no prior knowledge.

### Phase 5: Cutting and treatment (1 day)

We will travel to a nearby community which has received training in sustainable bamboo forestry and bamboo treatment.

#### Cutting

We will see bamboo growing in the wild and gain an understanding of proper clump management. From this you will really begin to perceive the potential of bamboo as a renewable construction resource, its ecological benefits and its possibilities as a sustainable economic foundation for rural communities.

#### Treatment

We will learn about the reasons why it is important to treat the bamboo. Will we explain the differing processes and see first-hand the heated immersion method of bamboo treatment using borax.

### Phase 6: Construction (7 days)

Bamboo construction knowledge will be embedded in the course throughout the design process and this will inform all the design work. You will be lectured on a series of bamboo joints as part of a comprehensive introduction to building with bamboo. From fish mouth joints to ear-joints, these will be incorporated into your design work and you will learn how to produce such joints in real-life.

In the later days of the course however we will devote more time to onsite bamboo construction workshops. We are aiming to drill down into the details of bamboo construction, producing practical innovations that can be applied to bamboo construction at the everyday village level. Participants will focus on a component of their concept design and develop this at 1:1 scale. This well-crafted mock-up will be a key deliverable of the AAMMVS and used to promote the grounded, creative benefits of the program to local communities.



# JOIN US IN MYANMAR

## 21 NOV - 2 DEC 2017

### WHAT YOU WILL LEARN

Participants will learn about bamboo construction combined with a range of computer modelling and testing software. This will allow participants to learn how to design with bamboo and test practical designs against the climatic threats facing Myanmar. We teach bamboo model making to give participants a tactile knowledge of the material and to bridge the gap between idea and building. We grow self-directed goals from participants to explore a variety of material, ecological and social issues in the workshop which affect Myanmar. We have seen the value of this work since 2014 in other AA Bamboo Lab programs which have addressed everything from bamboo's role in an urban setting to teaching the construction of a bamboo replicable, low cost 'core house'.

### SOFTWARE YOU WILL LEARN

Embedded in all the curricula we have taught, is an emphasis on a range of software with architectural applications which can allow participants to test and articulate their ideas and projects to a greater level. The course uses all the following pieces of software teaching them through various methods which allows students to find easy application in their own work. We make it very clear that the ability of computer programmes to test structure, or wind load, is no substitute for the relevant industry professional in that field. However, given the situation in Myanmar where many regulations are unenforced it can only help to give designers more tools through the design stages of their work and raise the awareness of these issues and the ways to mitigate the dangers of building in such a seismic and cyclone prone area.

**Rhinoceros 3D**, a NURBS (Non-uniform rational B-spline) software is our primary modelling software. This has been used as a tool for both abstract form finding as a response to student site observations, a software to produce technical drawings and diagrams, and our means of keeping an accurate model of our bamboo structures to verify details onsite.

**Grasshopper** allows the parametrisation of a model in Rhino. Instead of building with numeric input it is possible to have variable inputs which will change and react to new parameters. This allows us to quickly remodel based on new data, and find optimal solutions to design challenges given to us through the results of wind, solar and structural analysis.

**Karamba** is a finite element analysis which allows us to carry out structural testing on our bamboo designs.

**V-Ray** rendering software allows participants to render and visualise their bamboo architectural designs in a way which is easily communicative to others.

Given the risk of typhoons confronting any building project in Myanmar, we place a lot of importance on testing projects against typhoon winds. We use **Autodesk Flow** as a means of obtaining numeric data regarding pressure build up on models and then we can input these as point load forces in Karamba in order to see how the design can respond to the wind pressure either by reinforcing the structural system, or streamlining the design.

### ELIGIBILITY

The AAMMVS is open to students, professionals or PhD candidates from a variety of backgrounds who find an interest in the agenda of the course, as well as those with a background in architecture, engineering and design.

**Software Requirements:** You are responsible for supplying your own computer; we will use Adobe Creative Suite, Rhinoceros 3D and Grasshopper, and Adobe Flow. Though prior knowledge is welcome, all software will be introduced from a level of no prior knowledge.

### FEES

The following fee per overseas participant, which covers the costs of accommodation as well as food during visits to local workshops, is £785. This covers your: Course Fees (£685); Accommodation (£100); and an additional AA Visiting Member Fee (£60). **Please note that fees do not include transport to/from Myanmar.**

# READING LIST

**Building with Bamboo** by Gernot Minke. A very great textbook which shows bamboo material specifications as well as a very broad range of reference projects.

**Simón Vélez: Architect Mastering Bamboo** by Pierre Frey and Simon Velez, a retrospective look at Simon Velez's career which brought attention to the use of bamboo in contemporary architecture. His training and professional career offer an interesting insight into how bamboo can be accepted by the mainstream construction sector, as well as the overwhelming new opportunities the material gives the field of architecture.

**Bamboo: The Gift of the Gods** by Oscar Hidalgo López, one of the most comprehensive guides to all aspects of bamboo. From growth to construction to many other applications.

**Data Flow 2: Visualizing Information in Graphic Design** by Robert Klanten, a definition of contemporary information graphics to show how techniques such as simplification and abstraction can powerfully demonstrate new information and relationships.

**Yangon: Architectural Guide** by Ben Bansal and Elliott Fox, Architectural Guide Yangon presents around one hundred memorable buildings from Myanmar's historical capital.



## CODE OF CONDUCT

We take construction safety extremely seriously. Alcohol is banned during any activity associated with the bamboo construction workshops. If alcohol is found during the workshop hours, we reserve the right to ban any participant from further participation in the course.

## APPLICATION PROCESS

You can make an application online at the AA Visiting School website:

[www.aaschool.ac.uk](http://www.aaschool.ac.uk)

Fees include accommodation for those arriving on the day prior to the commencement of the course, and departing on the day following the completion of the course. Any additional days prior or onwards must be arranged by the participant. Participants need to bring their own laptops and digital equipment. Please ensure this equipment is covered by your own comprehensive travel insurance as the AA takes no responsibility for items lost or stolen at the workshop.

## VISA INFORMATION

It is a participant's responsibility to check with their local travel agent or embassy the ability of your citizenship to travel to Myanmar. Usually, participants from outside ASEAN will need to apply for a Myanmar tourist visa. If you are eligible, the online process for this is very straight forward. For more information please see <https://evisa.moip.gov.mm>

## WHAT TO BRING

### Equipment

You must bring with you a laptop, sketchbooks and relevant software. Other digital equipment such as cameras are also advised.

## Clothing and Mosquito Nets

We advise you to bring a mosquito net. For clothing, please bring comfortable clothing for a tropical climate, including a sun hat. The monsoon should have finished by November but a lightweight parka is a good idea. No sandals or flip flops will be allowed during bamboo construction. If you have long hair, please make sure you bring head-wear which can keep your hair clear of machines and you must have heavy footwear to use the machines. No sandals or flip flops will be allowed during bamboo construction.

## Provided safety equipment

During the workshop, we will provide the following personal protective equipment (PPE):

- Hi visibility vest
- Safety goggles
- Headwear
- Work gloves

## INSURANCE

Like all Visiting Schools we advise you to follow the local travel advisories before travelling and obtain comprehensive travel insurance for the duration of the trip that includes repatriation. Your insurance must also cover 'manual work in hazardous places' including construction sites engaging in woodworking activities. Remember normal medical facilities are very limited in Myanmar. Ensure your equipment is covered by your own insurance as the AA takes no responsibility for items lost or stolen at the workshop.

