



## **Innovative Strategies in Earthquake Rebuilding in Nepal**

The Australian Himalayan Foundation (AHF) has a strong history of cooperation with governments, local in-country partners, donors and the private sector to initiate inclusive and progressive development programs across the Himalaya.

The focus of its work in Nepal has been the provision of teacher training in over 300 schools in the Solukhumbu, one of the country's most remote regions. Working in conjunction with its in-country partner the Rural Education and Environment Development Centre (REED), the Ministry of Education and the UK and New Zealand Himalayan Trusts, AHF has led a Government accredited teacher training program that is recognised both in Australia and Nepal as a strong development and partnerships model.

The effects of the Nepalese earthquakes in 2015 were devastating with nearly 9,000 lives lost, and 1 million homes and 5,500 Government buildings destroyed or damaged. As the largest natural disaster the country had faced in over 80 years, the earthquakes present a range of challenges – as well as opportunities, to rebuild infrastructure along more sound earthquake resilient lines. The Nepalese Government is committed to rebuilding the country to set it on a path of sustainable development by improving the robustness of infrastructure and the safety of homes and schools.

More than 200 schools were either destroyed or damaged in AHF's focus area of the Solukhumbu region. AHF recognises the need to respond to the rebuild of these schools to ensure the ongoing benefits to children and communities of its education programs. It also recognises the need to apply an innovative strategy to support the rebuilding program by focusing on new work and new forms of cooperation that would address infrastructure issues as well as social needs to strengthen civil society.

The cumulative effect of AHF's and its partners work, and the relationships and goodwill that has been built up over many years, both in Nepal and in Australia, has resulted in the rapid commitment of a number of Australian technical experts to help AHF and its partners with the challenges of 'building back better'.

Neil Johanson, an awardwinning Sydney architect, had been on a trek in Nepal when the first earthquake hit in April 2015, and he met AHF Director, Peter Hilary at this time, who suggested that he work with AHF in the design and rebuilding of destroyed and damaged schools. One of the worst hit villages in Solukhumbu was Garma Secondary College with eight out of its nine classrooms at the special needs secondary school destroyed. Neil and his company Davenport Campbell developed

architectural plans for a low-cost environmentally sustainable, earthquake resilient school using best practice seismic principles and specifically catering for the needs of students with disabilities.

Two other AHF supporters teamed up to offer their engineering services - David Carolan from engineering firm Taylor Thomson Whitting, and Ken McBryde from architecture firm Hassel. They have developed steel framed building components light enough to be carried on the backs of porters into remote areas, yet strong enough to withstand future earthquakes as well as violent monsoonal storms that can occur in the Solukumbu area. Another focus of the design is for it be “buildable”. The light gauge steel sections are made up into flat pack panels that each weigh about 10 kgs. This particular method of building in a flat pack module is certainly a first for Nepal. It means a very simple method for erection on site using steel screws installed with a screw gun. As a result, the construction time is significantly shorter than traditional techniques as there are less materials to assemble on site. The design also incorporates “green” building principles via rain water collection; solar roof panels and substantially more windows than traditional classrooms and insulation in the building.

Together, Ken McBryde, David Carolan and Neil Johanson have created a school design that incorporates the natural traditional elements and style of Nepalese architecture with a functionality and durability that has never been used before in Nepal. The building’s frame can be easily assembled with a screw gun by local labour and the low stone structure built around a rammed earth base absorbs seismic forces and relies on the provision of local stone, local labour and traditional building techniques. The portability and lightweight structure means that the designs can be used across a range of earthquake prone areas in Nepal and the surrounding Himalaya region. Importantly, the design is low cost with building costs around A\$15,000 per structure.

With AHF’s track record in the region and relationships with local NGOs, communities and the Nepalese Government, these innovative plans have been approved by the Nepalese Ministry for Education and the rebuilding work is progressing impressively.

As part of the repair and reconstruction work, the AHF has also focussed on the upskilling of members of the communities in which these schools are based recognizing that there are high rates of youth unemployment. AHF has funded masonry and school building retrofit skills training courses for over 60 local people from the Solukhumbu district. This training was conducted by experienced trainers/engineers from the National Society For Earthquake Technology (NSET). The AHF has employed over 10 masons picked from across these training groups to complete the repair and retrofit of damaged classrooms at Garma Secondary School. Working with our in-country partner REED, this training has helped to build a skilled labour force that will boost local capacity and the economy which is integral to our ‘build back better’ project for Nepal.

AHF’s capacity to leverage from its long term relationships within Nepal and harness the innovative capabilities of its Australian supporters in the private sector demonstrates how developing dynamic responses to critical needs through partnerships that encompass communities and the private and public sectors can help ensure children’s ongoing access to education services in countries highly vulnerable to disasters.