

REPAIR OF SCHOOLS IN LA PAZ, BOLIVIA

By Patrick Reddin of Reddin & Nuttall

For the association, this is a FIRST. We have not often ventured outside the UK and, so far as I am aware, never advised on construction in Latin America. We are now firmly linked into a partnership with other UK and Latin American organisations, demonstrating our expertise in the technology of building and our willingness to impart that knowledge, and to learn, from others worldwide.

Tuesday 19 February 2002 – a day not to be easily forgotten in La Paz. At about 15:00 the skies opened and a storm, not seen for two or more generations began. Not rain, not a gentle snow fall, but hail. Large hailstones, filling underpasses and loading up roofs. The death toll rose to 70, with 140 injured and damage to property estimated at \$70million. Schools were damaged, some beyond repair.



Schoolroom after storm

British Gas Bolivia, operating extensively in the country, saw that urgent help was needed to get the schools operating again and not to deprive thousands of children, from the poorest families, of even the most basic education. British Gas Bolivia, initiated a fund to repair the schools affected by the disaster. Together with the BG Foundation, they put up \$10,000 to start the fund. Other contributors were sought and the British Embassy in La Paz contributed a further \$5,000. Once set up the fund was soon joined by companies and institutions from both Bolivia and the UK. SABSBA, CDDC, based in Bolivia and the Association of Building Engineers and Reddin & Nuttall, based in the UK.

As part of the contribution by the Association of Building Engineers, its President, Patrick Reddin, visited La Paz in the week commencing 15 April. This followed his visit to AL Partenariat in Rio de Janeiro, where, following initial discussions with Francois Moreau of BG Southern Cone, he described the disaster to the opening session of the conference, illustrating the depth of the



Ice block in main street, La Paz 19 February 2002

tragedy and announcing the support of the Association of Building Engineers, Reddin & Nuttall, Corporate Building Engineers for the British Gas Bolivia fund.



British Gas Bolivia, together with Councillor Natividad Ferrufino of the La Paz Alcaldía, had visited many of the damaged schools. The visit of Patrick Reddin was intended to help in the final selection of the first schools to be assisted.

On Tuesday 16 April, several schools were visited. A preliminary shortlisting of two schools was achieved the same day:

Escuela Barea

Located at the foot of a steep hill, with concrete steps leading down to a retaining wall. In the storm, the retaining wall failed to hold back the water and severe dampness penetrated into the classrooms and floodwater entered the school. The roofs of corrugated metal were unable to withstand the pressure of ice and flood water and junctions between roofs and between roofs and walls were damaged, allowing water to enter the rooms from above.

The school building provides for 3 shifts per day each for some 700 pupils. In early April, Ed Miller, BG Bolivia President visited this school to see for himself the damage caused by the storm.

Escuela Ladislo Cabrera/Libertad

This is a single building, built in 1953 and occupied by two schools. There are seven classrooms, an office, play area and toilets. The total area is 170m². In the morning 260 children attend Ladislo



Parents sign the Convenio confirming their donation of labour



Pat Reddin performing challa

Cabrera school and in the afternoon 250 with Libertad.

The walls are mainly of adobe and were severely eroded and undermined by the storm. As with Barea, the roofs of corrugated metal were unable to withstand the pressure of ice and floodwater and junctions between roofs and between roofs and walls were damaged, allowing water to enter the rooms from above. In addition the roof structures were so light that the load of the ice caused distortion and instability. The school was in use, but under appalling conditions.

Ed Miller, British Gas Bolivia President, had no hesitation in confirming that these schools were to be the first candidates for repairs by the British Gas Bolivia Fund, at a meeting in La Paz early on Wednesday 17 April. British Gas Bolivia agreed that repairs to Barea would include the drainage of the rear slope to prevent water flooding into the classrooms, repair of the damp-proofing to the walls and repair of the corrugated metal roofs.

In the case of Escuela Ladislo Cabrera/Libertad the damage was so severe and the existing structures so poor that repair was not a viable option. Ed Miller agreed that this school should be rebuilt, and so far as funds would allow set an example for future repair/renewal of schools.

Later that day a meeting was convened at the Alcalde in La Paz by Dra Natividad Ferrufino of the La Paz Alcaldia, attended by Ing Ninoska Cordova, Ing Silvia Villegas and Graduan Ingeniera Susse Carrasco, together with the President of the UK-based Association of Building Engineers, Patrick Reddin.

The repair works to Barea were agreed on the basis that the parents of the pupils would donate their labour to carry out the works at no cost. A meeting with a group of the parents on Friday 19 April agreed to assemble a workforce and once ready the repairs can commence.

The works of reconstruction to Escuela Ladislo Cabrera/Libertad were more complex to implement. The Alcaldia confirmed that the school was on privately-owned land, meaning that they would be unable to invest in the reconstruction as by law they are only empowered to invest in schools on municipal land.

It looked a bleak prospect, but a plot of land some 522m² in area was in the process of a change of use agreement, from open space to building land. This plot, some 500m away from the existing site had been proposed for a new school site for Escuela Ladislo Cabrera/Libertad in 1995, but for a number of reasons, nothing had progressed.

With the assistance of Patrick Reddin and the team of engineers, led by Ing Ninoska Cordova, the Alcaldia was able to confirm that this site would be made available. The normally slow bureaucracy was shaken to deliver this confirmation within a matter of hours and on Friday 19 April the parents of both Ladislo Cabrera and Libertad schools attended a challa (blessing) of the site, and confirmed that they would provide all the manual labour required at no cost.

The new building will be a "starter" scheme, with further facilities and space being added as funds permit. The initial school will be on one floor and provide six classrooms complying with the Alcaldia's current norms, as well as an office for the two Directors and accommodation for the Porter. The structure will be built to accommodate up to two further floors, to be added as funds permit. Walls will be of adobe rather than concrete or brick to deliver improved thermal efficiency, and use of locally-sourced material, in accordance with the principles of sustainable development.

The scheme is now being developed and the site was marked out by the Sub-alcaldia on Monday 22 April with the parents starting work on the perimeter walls at 08:30 Tuesday, 23 April.

Thanks to the enormous efforts and social responsibility of British Gas Bolivia, together with the other funders and contributors of expertise such as the UK-based Association of Building Engineers, and Reddin & Nuttall, Corporate Building Engineers, this school severely damaged by the storm of 19 February and beyond economic repair, is being replaced only 2 months later with a new school paid for by the fund, on land donated by the Alcaldia and built by the sweat-equity of the parents.

