



75 %
**schools operating
under capacity**

90 %
**schools built during
the Soviet era and need
seismic retrofitting**

377
**of 1,437+ schools currently
identified for seismic
retrofitting investment as
part of the governments
School Safety Improvement
Programme (SSIP)**

RECOMMENDATIONS

- Redefine the current School Safety Improvement Program to increase the impact and cover all schools by 2030.
- Conduct an assessment to determine how to reduce overcapacity and avoid retrofitting excess school buildings.
- Complete and combine multiple hazard mapping with school locations to identify exposure, and develop site planning guidelines as part of community masterplans.
- Develop rapid visual assessment methodology to capture key building and site characteristics to identify vulnerability.
- Develop guidelines and training for retrofitting existing schools.

ASSESSMENT

Hazard Assessment

Earthquakes, landslides, extreme temperatures and flooding are all significant hazards in Armenia. Good earthquake hazard information exists but is not yet included in the building code or planning process. The Japan International Cooperation Agency (JICA) have mapped 132 significant landslide risk areas and the schools exposed. Temperature ranges from -10 C to +36C can significantly accelerate the deterioration of buildings. Flooding is a low level national hazard but a significant localised hazard due to snow melt and summer rainstorms. There is a good understanding amongst experts of hazard assessments and seismic analysis, but there appears to be a potential knowledge gap in terms of seismic detailing.

Existing Education Infrastructure

Unreliable baseline data exists for all schools and would need to be objectively assessed in order to identify vulnerability, priorities and opportunities for consolidation without reducing teacher numbers. Four typical structural typologies are identified with the majority of schools (90%) built before 1990 exhibiting

poor seismic resistance and in need of retrofitting. An ongoing government rehabilitation program involving hundreds of schools does not appear to consider structural vulnerability and retrofitting.

Implementation Process

Schools are generally operated and maintained by the headmaster. As part of an extremely decentralised system, overall responsibility is shared and overlaps between the Ministry of Education and Science, local authorities (Marz) and community groups (Hamaynker). There appears to be a number of gaps in knowledge and capacity throughout the implementation process. Practical planning guidelines to inform site selection and planning do not appear to exist. The design and construction industry is very heterogeneous with limited capacity to retrofit effectively and at the scale required.

Regulatory Environment

The normative documents are generally robust but need refreshing to bring up to date and in line with international standards. Existing hazard information on earthquakes, landslides and floods are not

incorporated into the community master plans or planning process. The Building Codes and Standards are adapted from Russian SNiP Norms and whilst they are generally appropriate for Armenia, they do not provide practical guidance on how to build or retrofit safer schools to resist seismic loads. Quality assurance is devolved to multiple stakeholders which inhibits the ability to enforce codes at any minimum standard.

Financial Environment

The current government investment plan only includes seismic retrofits for 377 schools. Approximately US\$ 150 million of future government and donor programs covering 300 schools has been identified but it is unclear to what extent structural retrofits will be part of these programmes. Current estimates indicate that retrofitting costs US\$ 1 million and reconstruction costs US\$ 1.5 million per school. It is unclear what these estimates are based on and it does not appear that a robust cost benefit analysis has been conducted to determine how the funding could be prioritised across the portfolio of schools.



This study was conducted in collaboration with the World Bank and GFDRR as part of the Global Program for Safer Schools to provide technical support to GPSS Armenia country team by diagnosing education infrastructure vulnerability characteristics, and developing an action plan for technical assistance. It was conducted over an eight week period which included an eight day fact finding mission in December 2015. For more information, please contact:

ARUP INTERNATIONAL DEVELOPMENT

Joseph Stables
Senior Consultant

e. Joseph.Stables@arup.com
t. +44 20 7755 4839