

TERMS OF REFERENCE

Contract:	ICS-02		
Project:	Kyrgyz Republic: Skills Development System Transformation Program		
Expertise:	Senior Structural Engineer (Seismologist)		
Source:	National	Category:	Independent Individual Consultant

1. **Objectives and tasks of the assignment:** The Government of the Kyrgyz Republic, with the support of the Asian Development Bank (ADB), will implement the Skills Development System Transformation Programme (SDSTP) to strengthen the technical and vocational education and training (TVET). The programme will (i) improve the quality and relevance of TVET programmes (Outcome 1), (ii) improve the effectiveness of governance and systems (Outcome 2), (iii) improve the seismic resilience and learning conditions of educational infrastructure (Outcome 3) and (iv) promote inclusive, gender-sensitive pathways to employment (Outcome 4).

The Project Implementation Unit (PIU) of the Ministry of Education, in cooperation with the Agency for Community Development and Investment (ARIS, the implementing agency for Outcome 3), is seeking a Senior Structural Engineer specialising in earthquake-resistant construction (Structural Engineer) to provide technical guidance, comprehensive review and capacity-building support to ensure quality and the integration of earthquake-resilience aspects into the design documentation for the infrastructure component (Output 3).

In line with the programme's objective to **construct or renovate at least 10 vocational schools as disaster-resilient core educational institutions**, the design engineer will act as a technical expert on earthquake-resistant design and building modernisation strategies. The objective of the task is to improve the seismic resilience of new and renovated educational institutions, thereby protecting students and staff and preserving critical infrastructure. The structural engineer will provide support both during the preparation phase (by analysing proposed design criteria and guiding the feasibility study/detailed design) and during the initial implementation phase (by analysing designs and works), ensuring that the works comply with national regulatory standards, international best practice in earthquake-resistant design and project funding requirements.

2. **Scope of work:** The main tasks of the structural engineer will include:
- **Contributing to the preparation of project documentation**, including, amongst other things, DLI (Data Accessibility Indices), verification protocols and the programme action plan.
 - **Review of codes and standards:** identify key requirements of existing national building codes and standards relating to the construction of schools and vocational training institutions in the Kyrgyz Republic, in particular requirements relating to earthquake-resistant design and resilience to natural disasters. Identify any gaps or outdated provisions compared to international best practice in the field of earthquake-resistant structures. Where necessary, recommend additional or supplementary design requirements for educational establishments to enhance structural integrity and safety.
 - **Review of proposed design criteria:** Review of the proposed design briefs, including seismic design criteria for structures for new and existing facilities under the programme's infrastructure component (Output 3), covering aspects such as seismic loading, ground conditions, material properties and structural systems suitable for local high-risk conditions. These criteria and recommendations on structural systems will ensure that elements ensuring resilience to natural disasters (e.g. appropriate design loads, detailing of reinforcement, design approaches taking into account plasticity, etc.) are incorporated into the design of all new buildings and refurbishment projects within the programme. Close collaboration with climatologists and other specialists to ensure that design requirements fully account for climate change adaptation

issues (e.g., structural measures to protect against heavy snow loads, flood protection, measures to mitigate the effects of extreme temperatures), energy efficiency, fire safety, functionality, accessibility and inclusivity/gender aspects.

- **Analysis of site assessment results and structural surveys:** Collaboration with a national engineering and design firm, a geotechnical engineer (international) and relevant government engineers to conduct a technical review and ensure the quality of the structural assessment of existing facilities intended for refurbishment. Conducting a technical review of the scope of work required to modernise or reinforce each structure, as proposed by the firm(s). For new construction sites, analysis of any geotechnical reports or site surveys to predict foundation and design issues. Summarising the results of the technical assessment in consolidated reports with detailed notes to ensure the quality of the site assessment procedures and results carried out by the firm.
- **Provide methodological assistance and conduct technical reviews of conceptual engineering designs:** provide technical support to the design firm (national company) in preparing conceptual designs prior to the detailed design of schools and workshops. Ensure that the firm's architects/engineers incorporate the established seismic and structural criteria into their designs. To review and comment on the firm's preliminary engineering designs, drawings and calculations for each site, confirming their compliance with the required seismic resistance and safety standards. To confirm the suitability of the buildings selected for potential refurbishment at the conceptual design stage. Recommend any necessary changes to improve structural strength or compliance with national standards and international best practices.
- **Quality assurance of structural designs (detailed design documentation):** prior to issuing a tender for construction works, carry out a thorough review of the design documentation and ensure the quality of all detailed design drawings and specifications. Ensure that the project includes appropriate quality control measures during construction (e.g. material testing requirements, site inspection protocols). Ensure the integration of functional improvements, such as inclusive design elements (e.g. ramps, handrails, structural solutions to ensure accessibility), and energy-efficient measures (e.g. structural solutions for solar panels or thermal insulation installations), into the structural design in coordination with other experts.
- **Construction planning and management:** Assisting in the development of construction phase plans to maintain the quality of structures. Advising on necessary construction supervision measures and quality control procedures for civil engineering contractors. This includes developing checklists for site inspectors to verify critical structural elements (foundation works, reinforcement placement, concrete curing, etc.) and analysing material test data. If any innovative construction technologies or materials are to be used in the programme (e.g. seismic isolation, fibre-reinforced polymer (FRP), etc.), providing recommendations on their specification and application.
- **Capacity building and training:** Please assist in defining the project component relating to capacity building and training for local engineers and their colleagues, including the associated indicators based on the distribution of funds (DLI). Potential scope for this component may include workshops, consultations or practical sessions for PIU engineers, staff of local design institutes and site managers on seismic design principles, best construction practices to ensure quality and maintain structural integrity. Topics may include the interpretation of updated building code provisions, retrofitting methods, and lessons learnt from past school seismic retrofitting projects.
- **Procurement support:** Providing technical support during the procurement process for civil engineering contractors. Assisting the procurement specialist in reviewing the technical sections of tender documentation to ensure the appropriate inclusion of necessary technical specifications for building structures and contractor qualifications. Assistance in responding to any technical queries from tenderers. Upon receipt of tenders, provide support in evaluating them by verifying that the proposed methods or any alternative technical proposals comply with the requirements for building structures and seismic resistance.

- **Monitoring of works:** during the initial phase of works, carry out periodic (where possible) site visits to selected construction sites to monitor the progress of construction works. Ensure that contractors comply with design specifications and quality standards (e.g. correct detailing of reinforcement, material testing). Identify any on-site issues that could compromise the structural integrity and recommend corrective actions or design changes where necessary. Liaise with the project delivery team to ensure that all design changes or additional works are verified against the established requirements.
- **Documentation and reporting:** Document all recommendations and inspection results in writing. Prepare structural review reports for each major project under consideration, noting compliance with requirements and any changes made. Contribute to progress reports by providing sections on infrastructure design progress, compliance with seismic standards, and any risks or issues identified in structural aspects. Upon completion of the project, provide a summary report outlining the improvements in structural safety and seismic resilience achieved through the programme, as well as any further recommendations to the government on maintaining infrastructure resilience.

3. **Expected outcomes/tasks:** the structural engineer is expected to carry out the following tasks:

- i. **Preparation of project documentation**, including, but not limited to, DLI (Data Accessibility Indices), inspection protocols, and a training and capacity-building plan.
- ii. **A report reviewing the technical specifications/design guidelines** for school and workshop facilities funded by the programme (e.g. seismic design standards and criteria, as well as inclusive/climate-resilient elements to be used in accordance with contractors' proposals);
- iii. **Review of condition assessment reports** for existing facilities to be renovated (where available);
- iv. **Analysis of memos or reports on conceptual and detailed engineering designs** for each facility, with a detailed description of comments and necessary changes to the design firm's deliverables;
- v. High-quality technical preparation of **technical specifications and tender documentation** for construction works (ensuring the adequacy of provisions relating to building structures);
- vi. **Training materials and reports on seminars** regarding professional development activities carried out; and
- vii. **Materials for team meetings and programme progress reports** relating to infrastructure preparation, as well as other materials reasonably requested by the team leader.

4. **Minimum qualification requirements:** The expert must hold

- i. **A Master's degree and/or a higher education diploma obtained through a five-year programme (engineer) in civil/structural engineering**, with a specialisation or a significant number of courses in earthquake-resistant engineering or the design of earthquake-resistant structures.
- ii. **15 years of post-graduate work experience** in the field of earthquake-resistant/structural engineering, including at least 10 years' experience in the seismic design of structures, including the conduct of seismic assessments and the retrofitting of buildings, as well as a professional qualification certificate in civil/structural engineering.
- iii. Knowledge of the current design standards of the Kyrgyz Republic is required, as well as strong skills in the review of design documentation and construction supervision. International experience and knowledge of international seismic design standards (e.g. Eurocodes or IBC) are desirable.
- iv. Experience in **school or public building construction projects** is required, as well as knowledge of national structural design and seismic resistance standards.

- v. Experience of working on projects funded by international organisations (e.g. the Asian Development Bank, the World Bank) or similar is desirable.
- vi. Fluency in Russian and Kyrgyz is required; basic knowledge of written and/or spoken English is desirable.

5. **Reporting line:** The Structural Engineer will support ARIS and the PIU to ensure the construction of safe, earthquake-resistant, climate-resilient and inclusive educational facilities in accordance with national standards and best practice. The Structural Engineer will report to the Deputy Executive Director (ARIS) and the Head of the Infrastructure Development Unit (, Ministry of Education) and work in close collaboration (on a day-to-day basis) with the Unit’s Infrastructure Development Programme Coordinator.

The Structural Engineer will work closely with design firms, providing them with recommendations and reviewing their work. Coordination and collaboration with the Senior Natural Disaster Risk Management Specialist, the Senior Geotechnical Engineer and the International Climate Specialist will be crucial for integrating best practices, disaster resilience measures and climate change considerations into conceptual and detailed engineering designs. The consultant will also liaise with relevant government bodies, such as the Ministry of Construction, Architecture and Housing and Communal Services, as necessary to obtain design approvals. Regular progress and results reports will be submitted to the team leader and included in the overall project reporting to the Asian Development Bank. The work will be of a periodic nature during the programme preparation and initial implementation phase (up to 36 months) and will involve both site visits to project locations in the Kyrgyz Republic and remote work (from home) to analyse project documentation.

Place of Execution:	Duration:	Dates:
Duty station is in PIU, located at the address: Bishkek, Manas ave. 22A.	36 months, with the possibility of extension.	Contract Commences _____, subject to ADB approval. Contract Validity _____.
Contract Period:	-----	-----