Harmonization of Georgian Engineering Education and Technical Regulations with EU Standards

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DOI: https://doi.org/10.52340/building.2026.73.01.12

Abstract Existing technical norms and standards in Georgia are currently based on outdated former Soviet regulations (SNIP), combined in an ad hoc manner with modern standards adopted in 37 countries. This situation reflects systemic structural inefficiency that increases costs across the entire infrastructure lifecycle, undermines investor confidence, and weakens national economic competitiveness. From an economic policy perspective, the optimal solution would be full harmonization with a single, internationally recognized standards system, accompanied by institutional strengthening and capacity building. However, given Georgia's current development context, it is evident that challenges related to technical regulations cannot be deferred until the education system fully matures—from primary and secondary education through to advanced engineering programs. The urgency of the situation calls for a pragmatic, non-standard approach that addresses immediate needs while simultaneously laying the foundation for sustainable, long-term capacity development. This article represents an attempt to identify a solution within the existing constraints.

Keywords: Engineering Education, technical regulations, norms and standards, technical assistance project, Bologna Process, Logical Framework Approach, EU Standards.

I. Background

Existing technical **norms and standards in** Georgia are presently based on outdated former Soviet norms (SNIP), combined in an ad hoc manner with standards current in 37 countries (GOG Resolution N50, March 7, 2013), e.g. USA, UK. The author observed a situation in which an internationally recognized bridge engineer, during the review of design documentation for a major infrastructure project in Georgia, expressed concern and noted: *"The bridge foundation has been designed in accordance with Russian specifications, whereas the superstructure has been designed in accordance with Eurocode standards. The design standards applied must be consistent and uniform across the entire structure."*

The situation represents a **systemic structural inefficiency** what raises costs across the entire infrastructure lifecycle, undermines investor confidence, and reduces national economic competitiveness. From an economic policy perspective, the optimal solution would be full harmonization with a single, internationally recognized standard system, accompanied by institutional strengthening and capacity building.

At present, the main barrier to harmonization lies in the significant shortage of Georgian professionals proficient in modern international engineering standards. It is widely acknowledged that the resolution of complex technical issues in Georgia requires the involvement of foreign engineers from developed countries. Indeed, over the past decades, most major construction projects in Georgia have been designed and implemented by foreign engineers and companies—particularly those financed through loans or grants from International Financial Institutions (IFIs), which require participating engineers to hold international qualifications. Due to the lack of qualified local specialists, the Government of Georgia has been compelled to rely on foreign experts. Georgian consulting and construction companies face challenges in competing in international tenders.

It should be noted that since the early 1990s—when the first IFIs commenced operations in Georgia—millions of dollars have been invested in technical assistance projects, including numerous training initiatives. Nevertheless, no locally trained engineer has yet attained internationally recognized qualifications as a direct result of these programmes. This outcome is unsurprising: in a country where the foundational engineering education system remains underdeveloped, short-term training cannot substitute for comprehensive academic preparation. This outcome can also be attributed to the **inefficient coordination and management of technical assistance projects** /1/.

The current approach typically involves engaging foreign experts—often through donor-funded initiatives—to draft Georgian versions to European regulations. These are then translated and formally adopted by the Government as legal instruments, accompanied by short-term training programs for selected groups of Georgian engineers.

However, this approach alone will not deliver sustainable results. In advanced economies, technical standards are developed and continuously refined by domestic professional associations and expert teams—ensuring relevance and long-term applicability. For Georgia to effectively adopt and maintain modern European technical regulations, it is essential that local professionals not only understand these standards but also take full ownership of them. Achieving this requires a strong academic foundation. **Short-term training programs, while useful for immediate capacity building, cannot replace the depth and rigor of formal education**. Without investing in academic excellence, Georgia risks dependency on external expertise and limited progress toward true modernization.

Accordingly, **developing a strong corps of nationally qualified engineers** is a prerequisite for the successful introduction and long-term maintenance of EU-harmonized technical regulations in any industrial sector of Georgia. Unfortunately, the current state of higher education in the country provides little assurance that Georgian universities will be capable of producing internationally qualified engineers within the next decade.

It is also unrealistic to expect that Georgian engineers educated abroad will substantially change the situation. While government support for overseas education is commendable, such efforts alone cannot ensure systemic improvement. Given the overall condition of the national university system, the broader impact of this strategy is expected to remain limited.

Another issue lies in the **linguistic and terminological domain**. Foreign educational institutions cannot address the challenge of developing Georgian-language technical terminology aligned with modern international standards. The lack of accurate Georgian translations of technical terms creates substantial difficulties in professional communication, which, by constitutional requirement, must be conducted in the Georgian language. The existing corpus of Georgian technical terminology, developed over many decades, provides a solid foundation for professional communication but requires further modernization for both practical application and academic use.

Given Georgia's current development context, it is clear that addressing challenges related to technical regulations cannot be postponed until the education system fully matures—from primary and secondary schooling through to advanced engineering programs.

The urgency of the situation calls for a **pragmatic, non-standard approach** that tackles immediate needs while laying the foundation for sustainable, long-term capacity building. Achieving this requires coordinated action among key stakeholders—government institutions, industry leaders, academic bodies, and professional associations—to pool resources, share expertise, and jointly drive solutions that balance short-term priorities with long-term development goals.

II. The proposed project approach in brief

Very briefly, the project idea is visualized below in Fig.1, where Fig. 1a shows students graduation from the zero level with the perspective of reaching professional maturity in around 10-12 years with certain professional engineering knowledge/experience of the level of the European standards. Based on specially developed criteria, a Core Team of engineers can be selected and educated to a level close to the EU standard requirements (Fig.1b). This group of engineers can form the Core Team of professionals of a specific engineering sector/subsector, which will be used in two directions: 1. Creation and delivery of **English/Georgian university courses** to ensure the sustainability of the engineering education process, and 2. Creation/further development of specific **technical standards**

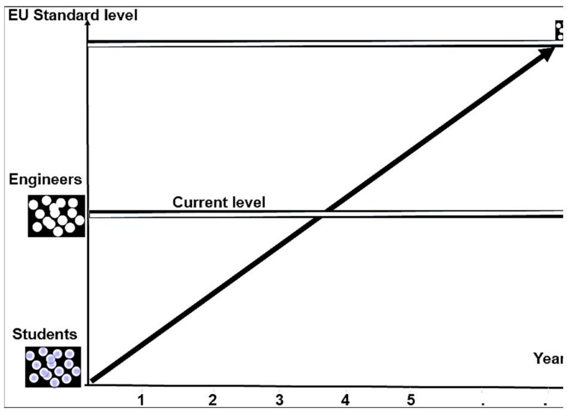

Fig. 1a

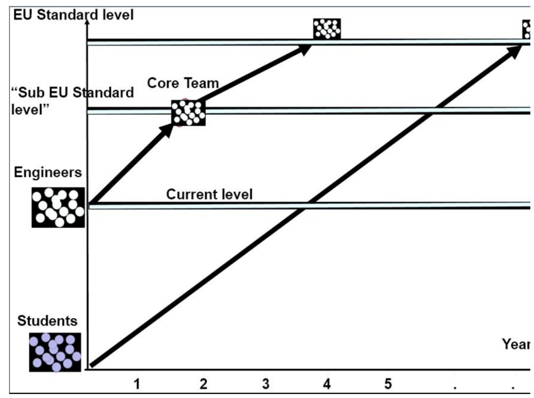

Fig. 1b

This project proposal focuses on the development of engineering capability *(the capacity to design, analyze, optimize, etc.)*, rather than technical capability (t*he practical ability to utilize specific tools, technologies, etc.)*.

To illustrate the approach, Figure 2 presents the diagram broadly illustrating the Bologna Process scheme, but in a simplified and discipline-specific way. According to it, after completing a general 3-year course in civil engineering, a 2-year master's degree in individual fields is prescribed, for example - transport, buildings, hydraulic engineering, etc.

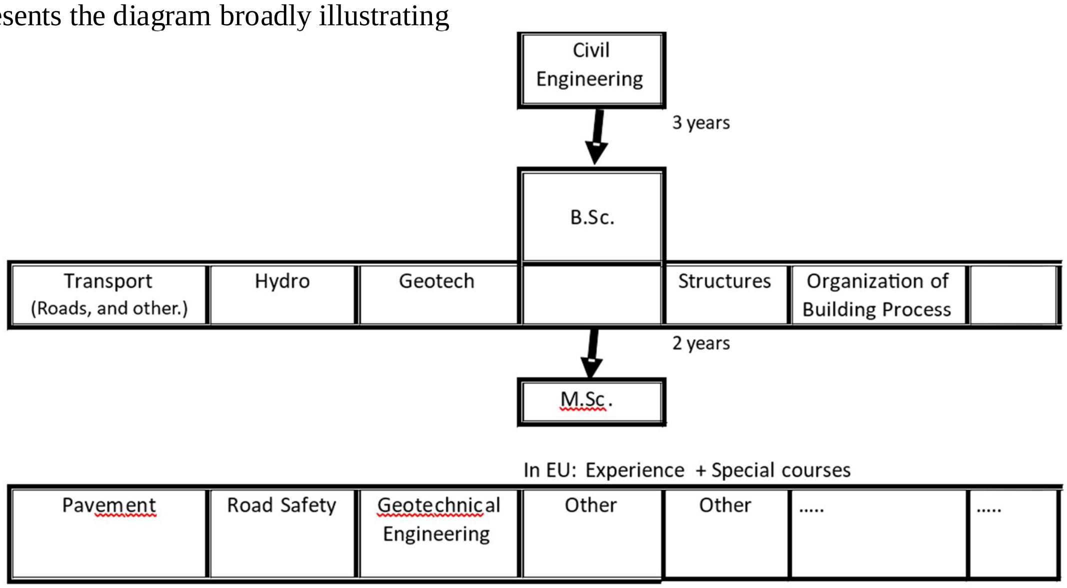

Fig. 2 Simplified Bologna Process scheme

According to the proposed approach, based on predefined criteria, Georgian engineers with relevant academic education and practical experience will be selected. Through a specially designed program, they will upgrade their qualifications to a level that meets European certification standards in certain engineering fields listed in the bottom strip of Figure 2.

The main risk factors of the approach are:

1. Identifying engineers in Georgia with the above-mentioned theoretical and practical experience, and
2. Retaining qualified Georgian engineers within the country after the project completion.

The Project is to be implemented by a team of selected international and local experts, in accordance with the international tender procedures of an International Financial Institution (IFI) or donor organization. The project team will include an internationally recognized engineering consulting company and an internationally accredited university with a relevant engineering specialization.

To present the project proposal in a structured and systematic manner, it is formulated below using the Logical Framework Approach (LFA), which is widely applied by IFIs /2/.In this paper, only the first column of the LFA Matrix—**the Intervention Logic**—**is presented**. While the Project concept can be adapted to any industrial sector/sub-sector, it is presented here in the context of **Road Engineering Sector**

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LOGICAL FRAMEWORK

Intervention Logic	indicators	Means of Verification	Assumptions
Goal/General Objective			
Purpose			
Outcome			
Results			
Result 1			
Result 2			
Result 3			
Result 4			
Result 5			
....			
Activities	Inputs		
Activity for achieving result 1			
Activity for achieving result 2			
Activity for achieving result 3			
Activity for achieving result 4			
Activity for achieving result 5			
Activity for achieving result …			

Fig. 3 Logical Framework Matrix

The proposal is considered for the conventional branch of Road Engineering, named as **Proff Engineering**, which can be any subsector, e.g. - Asphalt Engineering, Road Safety Engineering, Geotechnical Engineering), etc. Only the first column of the Logical Framework Matrix – Intervention Logic, is used below for description of the conventional project. Other elements of the matrix are subject of determination at the specific project detailed design stage.

III. The Project

Harmonization of Georgian Engineering Education and Technical Regulations with EU Standards

(Conventional Model)

The first four lines of the Intervention Logic - Goal, Purpose, Outcomes and Results are presented on Fig.4. The three results—Theoretical Basis for Engineering, Core Team of Engineers, and Institutional Measures—constitute the supporting pillars that drive the outcomes necessary to achieve the overarching purpose: **harmonizing specific professional engineering fields with European standards**. Given the conventional nature of this approach within professional engineering, the project proposal is referred to as a “Conventional Model.” This model establishes a replicable framework for aligning Georgia’s engineering practices with European norms.

Activities to achieve the Results follows. It is illustrated for the Asphalt Engineering case

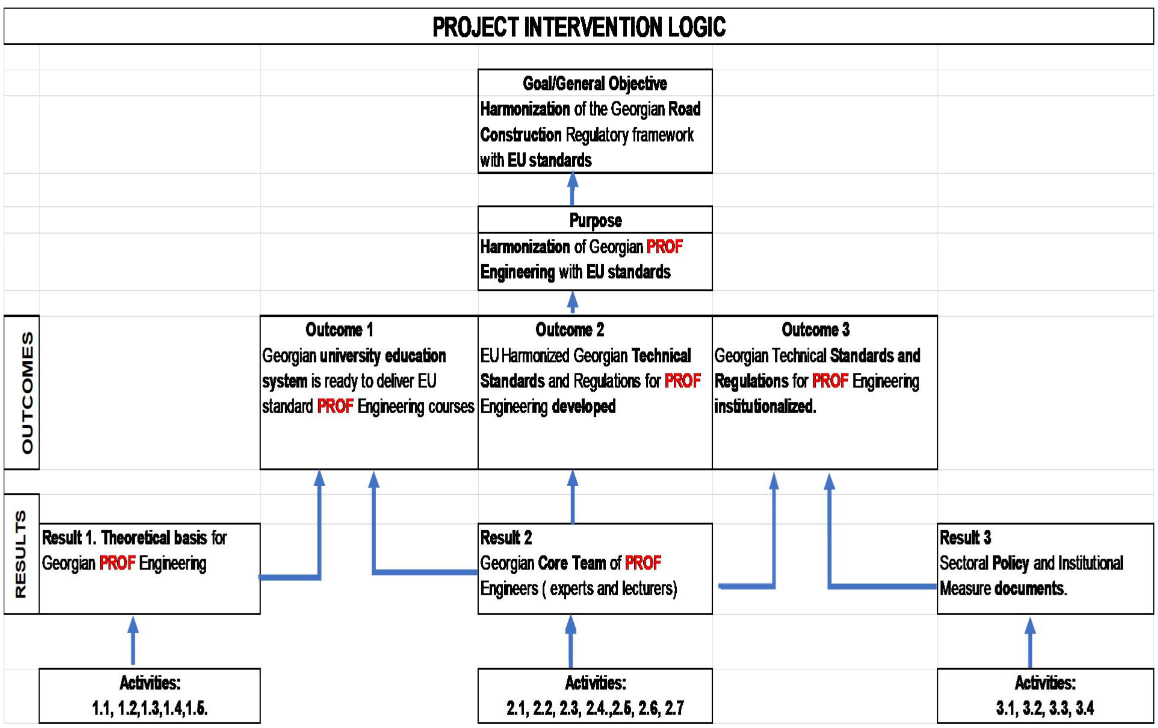

Fig. 4 Goal, Purpose, Outcomes and Results

Activities to achive the reasults

Result 1 – Theoretical Basis for Georgia PROF Engineering

1.1 Select **local team of experts** based on;

1. Specific requirements for the selection of Georgian experts, aligned with the needs of the respective PROF Engineering field. The selection will be conducted through transparent procedures and objective criteria.
2. Technical interview.
3. Personality profile assessment.

Annex 1.1 illustrates the selection process, using the Asphalt Engineering case as an example.

1.2 Analyses of **existing in Georgia education/training programs** in PROF

Engineers.

1.3 Develop **English-language Educational Modules** for PROF Engineering**.**

Create a set of courses and modules that provide the theoretical foundation required for Georgian universities to achieve international accreditation in selected engineering fields. These modules will be finalized and made available to Georgian universities after project completion.

Annex 1.2 illustrates modules for the Asphalt Engineering case.

1.4 Prepare Educational **Program Timeline**

Annex 1.3 illustrates the Asphalt Engineering case.

1.5 Analyses of existing **laboratory equipment** in Georgia. The Educational Modules will include conducting laboratory and practical studies in the field when it is required by the course.

Result 2 – Georgian Core Team of PROF Engineers

2.1 **Translation** of educational modules in Georgian.

The Georgian experts will prepare Georgian versions of the English courses based on consultations with the foreign experts - authors of the English courses.

2.2 **Educating** the local team of experts.

International Experts deliver learning courses following the **Educational Modules** and **Timeline** including conducting laboratory and practical studies in the field when it is required by the course. Video recordings of the learning courses will be produced.

2.3 **Certification based** on qualification examination/testing.

The qualification examination/testing of local team of experts will be held upon completion of the course. The participants who pass the examinations successfully will receive certificates. These certified engineers will make up the **Core Team of Georgian Engineers** – one of the most important Project results. The team will be capable for lecturing in Georgian univesities as well as of contributing to the development of the EU Harmonized Georgian Technical Regulations in coopeartion with international experts. The Government of Georgia (GOG) will introduce a special status for the certified Georgian Engineers (see activities for Result 3).

2.4 **Identify Georgian lecturers** capable of delivering educational courses in Georgian universities.

The availability of English-Georgian learning courses and Georgian lecturers will make it possible to start delivering the courses in Georgian public or private universities. Depending on the degree of interest from the Georgian universities, it will be possible to see where the qualified Georgian lecturers will continue their academic careers.

2.5 Establish an **editorial board** for creating a Glossary of terms on educational and regulatory documents in **PROF Engineering** (with Comments).

2.6 Delivery of **PROF Engineering learning courses by Georgian experts** with evaluation of performance of Georgian lecturers. Details of this activity will be planned during the project implementation phase depending on existing realities.

2.7 Preparation of **Glossary** of terms/Comments on regulatory documents (English-Georgian) by the Georgian Core Team in cooperation with Internationally Qualified Experts.

Result 3. Preparation of supporting documents for Sectoral policy and institutional measures

3.1 Establishment of certification procedures for **PROF Engineers** (including examination procedures).

3.2 Establishment of associations of PROF engineers under the leadership of certified engineers.

3.3 Creation of a Chamber of **PROF Engineers**

3.4 Drafting a government decree/law that would regulate the rights and responsibilities of **PROF Engineers** registered with the Chamber of Engineers.

Final comments

The presented project proposal is at the **idea level,** and many details are to be considered to bring it to its final form in any direction. In fact, the approach aims to **support the ongoing development of the education system from the upper levels downward, rather than following the traditional progression from primary and secondary schooling to higher education**.

The Logical Framework **Matrix** must be completed what is closely related to who would be involved in the project development. Potential participants jointly or separately can be:

- The Governement of Georgia (GOG)
- International Financial Institutions (IFI) and foreign aid agencies
- Private investment fund
- Georgian Universities
- Georgian consulting companies, and
- Professional associations

Probably best option would be to use the Public Private Partnership (PPP) concept with participation of above-mentioned actors. The cornerstone of such partnership can be a credit/grant agreement between GOG and specific IFI and/or funding agencies, which will outline the responsibilities of participants. Initially the pilot project with a specific engineering profile can be designed. This will create a basis for the dissemination of the concept in various directions /3/.

Project implementation would typically take an average of 6 to 12 months, depending on the specific configuration and qualifications of the selected Georgian experts. Cost implications as well as risk estimations mentioned in the section III above are not addressed in this outline and will be considered during the detailed design phase. A cost-benefit analysis for sector-specific projects, based on a 10-year timeframe, is expected to yield positive results taking into account existing circumstances in various industrial sectors.

It is possible that a better solution than the one formulated in this proposal can be designed. To arrive at the best possible solution, however, the **discussions need to be held** with qualified professionals and a wider public audience. It is to be done **comparison of the proposed project versus other proposals and versus the alternative of maintaining the status quo ('do nothing alternative'**). In the event of the latter the results will be like those, which have taken place thus far in many industrial sectors of Georgia.

Acknowledgment

The author expresses sincere gratitude to Luka Krnić, Mag. Chem. Ing., TPA GmbH Croatia, for his outstanding contribution to this work. Mr. Krnić prepared a highly valuable annex on the Asphalt Pavement Engineering case, which significantly enhanced the overall quality and depth of the study.

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Annex 1. Asphalt Pavement Engineering case

1.1 Requirements for the selection of Georgian experts (Tentative)

- Previous experience (national or international) in the field of Pavement Engineering – as designer, contractor, QA/QC, supervisor
- Formal (institutional) or non-formal education in the field of Pavement Engineering
- Motivation for working in the field of Pavement Engineering based on rational reasons – (in addition to oral interview, it is reasonable to conduct an analysis based on measurable indicators)
- Readiness for permanent education (including international) and effective transfer of knowledge to colleagues in Georgia (potential of knowledge transfer can be tested by different evaluation methods)

1.2 Educational Modules

M1 Structural analysis and design of asphalt pavements. Cabinet work, 20 hours

Theoretical base for structural analysis and design of asphalt pavement structures. Preparation and conducting destructive or non-destructive field measurements and laboratory tests. Structural analysis and structural design of new asphalt pavement construction according to results of measurements and tests, design of reconstruction and maintenance works, preparation of heavy maintenance plan for short, middle, and long-term

M2 Quality production and paving of asphalt mixtures. Cabinet work 20 hours, site work (asphalt plant, separation plant, asphalt paving site) – 35 hours

Introduction to the constituent materials for asphalt production (aggregate, filler, bitumen, additives), getting acquainted with production processes at plants (asphalt plant), transport and paving (equipment and working processes). This module has a mandatory field part (visit to asphalt bases, separation plants for aggregate production, bitumen production plants, several visits to building sites during paving of asphalt mixtures)

M3 Design of asphalt mixtures cabinet work, 20 hours

Empirical and fundamental approach to mix design of bituminous mixtures, calculation and preparation of mix designs, laboratory mixing, and testing of designed asphalt mixture, preparation of job-mix formula

M4 Quality control and evaluation of produced asphalt mixtures and compacted asphalt layer cabinet work, 15 hours, laboratory work 25 hours

Procedures for the implementation of all processes in ensuring the quality of produced asphalt mixtures and installed asphalt layers. Implementation of laboratory and field tests, analysis and evaluation of test results. This module has a mandatory field part (field testing of built-in asphalt) and part of the work and lectures done in asphalt laboratory.

M5 Maintenance of asphalt pavements, cabinet work, 20 hours

Planning, organization and execution of pavement inspection, analysis of results of pavement inspection (data collection and analysis – Pavement Management System (PMS). Establishing the correct technical parameters of pavement condition in Pavement Management System. Correct decision-making on taking pavement maintenance actions according to analysis of collected data in PMS. Development of maintenance plans in the short, medium and long term

Note: All modules are prepared in a way that all related norms and standards are based on actual EU regulations which are preferable to Georgian conditions (climate, traffic…)

1.3 Educational Program Timeline

M1 Structural analysis and design of asphalt pavements - cabinet work, 20 hours

M2 Quality production and paving of asphalt mixtures (component materials (aggregate, bitumen, additives), production processes (asphalt base), transport and paving (equipment and working processes) – cabinet work 20 hours, site work (asphalt plant, separation plant, asphalt paving site) – 35 hours

M3 Design of asphalt mixtures – cabinet work, 20 hours

M4 Quality control and evaluation of produced asphalt mixtures and compacted asphalt layer (this module has a mandatory field part (field testing of built-in asphalt) and part of the work and lectures done in asphalt laboratory) - cabinet work, 15 hours, laboratory work 25 hours

M5 Maintenance of asphalt pavements - cabinet work, 20 hours

TOTAL: 155 hours