The performance of the built environment and the construction sector are of major importance in Europe’s long term goals of sustainable development in a changing climate. At the same time, the quality of life of all European citizens needs to be improved and the safety of the built environment with respect to man-made and natural hazards, such as flooding and earthquakes, needs to be ensured. Education has a central role to play in the transformation of a construction sector required to meet increasing demands with regard to safety and sustainability.

**Getting involved**

Would you like to have information about the project?  
Are you interested in sharing your expertise with the SASICE consortium?  
Are you interested in having some subjects of the project taught at your university?  
Would you like to be a teacher for the project in one of the consortium Universities?

Please fill–in the on–line form at:  
http://sasice.unibo.it/node/69

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Project description

As a response to the present challenges related to the performance of the built environment and to the sustainability of development, eight partner universities have started Curriculum Development project “Safety and Sustainability in Civil Engineering” (SASICE), funded by the European Community within the Erasmus Lifelong Learning Program. The aim of this project is to promote the integration of safety and sustainability in civil engineering education.

The project will have a wide impact through an extensive dissemination of the results among stakeholders throughout Europe by informing professional organizations, European umbrella organizations and organizations dealing with education such as the European Society for Engineering Education (SEFI). The development of flexible teaching modules supported by powerful ICT services will allow exploiting the results in a wide spectrum of educational settings within higher education institutions. The project will also stimulate legislative or technical changes required to facilitate the development of joint programmes. An open community will be created, discussing learning needs in safety and sustainability in an European context, with opportunities for further exploitation.

Teaching modules will be developed in 4 thematic areas: i) Safety in construction; ii) Natural Hazards and Management of Risk; iii) Sustainability in construction; and iv) Sustainable Development and Environmental Protection. The development of the teaching modules is based on an extensive analysis of the needs for highly qualified education on Safety and Sustainability.

Pilot project

A pilot project will be developed in the last year of the project, where the modules, developed by the network in a coordinated manner, will be given in various Universities. A teaching plan will be prepared, with professors going to give lectures in foreign Universities. To this purpose, some modules will be selected and given in more Universities. In the courses, mid-term tests, final exams and homeworks will be given to the students in the same manner, and evaluation criteria established and agreed by the partners be applied to give the student scores will be used. At the end of the courses, the quality assurance of the teaching level will be also monitored with student questionnaires. Having foreign professors to teach the modules in their own University will be a good opportunity also for the students that do not plan a mobility experience to have an interesting internationalization-at-home experience.

Safety in construction

The aim of this module is to present best practice from across Europe on the assessment, repair and strengthening of existing structures. The focus of the module is on masonry, steel and reinforced concrete structures. The context is first set by a general introduction that includes what can be learned by examining past structural failures. The module is then divided into three parts, looking at firstly assessment techniques for existing structures (focussing on field-based methods of survey and assessment), then moving on to how the safety margin of an existing structure can be estimated quantitatively by utilising probabilistic methods of assessment of structural strength and loadings. Finally, the module examines repair and strengthening techniques that are available for structures and foundations, and techniques for their appropriate selection.

Sustainability in construction

Sustainability is a problem that cannot be faced at a Country level only, because the consequences on the environment of sustainable construction techniques often can be recognized at a very large scale (typically transnational). Sustainability can be achieved by facing different aspects of the construction process, from the material production, to the impact of the construction techniques on the environment, to the energy saving of the final construction, to its durability during time. A "cradle-to-grave" analysis of building products, from the gathering of raw materials to their ultimate disposal, provides a better understanding of the long-term costs of materials. These costs are paid not only by the client, but also by the owner, the occupants, and the environment. In the teaching modules, all these aspects will be considered, and quantitative techniques and protocols to quantify and certify the sustainability of a construction, such as the Athena or the ITACA protocols, or the LEED system of certification of the United States Green Building Council (USGBC) will be studied.

Natural Hazards and Risk Management

This module is structured into three main categories: (a) Physical and socio-economic processes and systems (b) Risk Management Framework and (c) discussion of case studies. The first includes the types of natural hazards, the estimation of vulnerability and the consequences of natural hazards as well as the impact of climate change on the risk and the associated structural and non-structural measures for hazard risk mitigation. The second describes the general framework for risk management, defining and analysing the various components of risk management (risk analysis, risk assessment and risk reduction). The SPRC model is presented together with the Data requirements and the calculation methods for hazard, vulnerability and risk. Finally, based on the above risk management framework, case studies (floods, earthquakes and landslides) are discussed.

Sustainable Development and Environmental Protection

Conventional approaches in development planning and the environmental conflicts generated by them will be presented as well as long-term environmental sustainability issues. The theory and practice of environment and sustainable development at the international, national and urban levels in a variety of contexts will be critically examined and an understanding of the processes generating social and environmental changes will be provided together with the skills and abilities to respond to such changes. This module will adopt a European and international comparative perspective, exploring the specific conditions for intervention in different contexts, involving lectures, case studies and discussion of theory.