UDC 691:006.83:338.45
JEL: L74; F15; O52; Q01; M11; K23
DOI: https://doi.org/10.32983/2222-4459-2026-1-170-182

EU REGULATORY AND TECHNICAL FOUNDATIONS FOR CONSTRUCTION MATERIALS: ECONOMIC RATIONALE FOR INTEGRATING STANDARDS AND REGULATIONS INTO ARCHITECTURAL AND CONSTRUCTION PROJECTS

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UDC 691:006.83:338.45
JEL: L74; F15; O52; Q01; M11; K23

Mykhalko A. O., Kubanov R. A., Denysiuk O. V., Makatora D. A.
EU Regulatory and Technical Foundations for Construction Materials: Economic Rationale for Integrating Standards and Regulations into Architectural and Construction Projects

The article examines the regulatory and technical foundations for the use of construction materials in the European Union and substantiates the economic efficiency of integrating European standards and regulations into the activities of Ukrainian architectural and construction companies. It is shown that the contemporary development of the sector takes place under conditions of deep integration into the European economic space; however, a gap remains between the existing national standards and EU requirements. This gap complicates the entry of Ukrainian companies into the international market and reduces their competitiveness. The article analyses the evolution of European construction policy, beginning with the "New Approach" of 1985, which laid the foundations for simplifying access to the internal market and for the transition from detailed technical specifications to essential requirements. It is determined that the subsequent "Global Approach" complemented these principles by focusing on conformity assessment of products against standards. This created favourable conditions for innovation, the development of a competitive environment, and the formation of a unified system of requirements for construction materials. Particular attention is paid to key EU standards: EN Eurocodes (EN 1990–1999), EU Regulation No. 305/2011 (CPR), EN 206 (Concrete), EN 771 (Masonry Units), EN 13163 (Thermal insulation products), EN 14081 (Timber structures), EN 1090 (Steel structures), EN 15804 (Environmental Product Declarations), and EN 13501 (Fire classification). These standards define requirements for strength, durability, energy efficiency, environmental performance, and the safety of construction materials. For Ukrainian companies, their implementation signifies not only an improvement in product quality but also access to the European market, participation in international tenders, and the formation of a positive corporate image. The article presents examples of harmonisation of EU standards with Ukrainian DSTU standards, which already cover concrete, masonry products, thermal insulation, timber, steel, fire safety, and environmental declarations. At the same time, it is emphasised that the process of adapting the Eurocodes and the CPR remains incomplete and requires a systemic approach. The absence of a unified roadmap for standards integration leads to fragmented actions by companies that do not always recognise the strategic benefits of certification, CE marking, or environmental declarations. The methodological framework of the study is based on systemic, comparative, and economic-analytical approaches. The research employs methods of content analysis of regulatory documents, expert assessments, and case studies to examine practical examples of harmonisation. Statistical analysis of data on the implementation of EN 206, EN 771, EN 1090, and EN 15804 was applied, making it possible to quantitatively assess the effectiveness of their use. The results of the study demonstrate that the integration of EU standards into the activities of Ukrainian architectural and construction companies provides four key advantages: technical quality (durability and safety of structures), customer trust (process transparency, CE marking, environmental declarations), market access (participation in international tenders and projects), and economic benefits (reduced maintenance costs, resource optimisation, compliance with ESG requirements). Thus, EU standards function not only as a formal regulatory requirement but also as a strategic development instrument that enables Ukrainian companies to operate confidently, transparently, and efficiently in both domestic and external markets. The implementation of these standards is economically sound, reputationally advantageous, and strategically necessary for the sustainable development of Ukraine's construction industry in the context of European integration.

Keywords: *European standards (EN, Eurocodes, CPR), harmonisation of DSTU and EN, construction materials, economic efficiency, CE marking, environmental declarations (EPD, EN 15804), fire safety (EN 13501), building energy efficiency, architectural and construction companies, project activities, project management, integration into the EU market, competitiveness, and international tenders.*

Tabl.: *4.* ***Bibl.:*** *35.*

Mykhalko Anastasiia O. *– PhD (Engineering), Associate Professor, Associate Professor of the Department of Mechanical Engineering, Kyiv National University of Technologies and Design (2 Mala Shiianovska Str., Kyiv, 01011, Ukraine)*
E-mail: *nastya_franchuk16@yahoo.com*
ORCID: *https://orcid.org/0000-0001-8203-7488*
Researcher ID: *GYD-4871-2022*

Kubanov Ruslan A. *– PhD (Pedagogy), Associate Professor, Associate Professor of the Department of Development and Spatial Planning, Separate structural subdivision "Institute of Innovative Education of the Kyiv National University of Civil Engineering and Architecture" (4 Osvity Str., Kyiv, 03037, Ukraine)*
E-mail: *kubanov12@gmail.com*
ORCID: *https://orcid.org/0000-0002-0121-4858*
Researcher ID: *L-6715-2018*

Denysiuk Olga V. *– PhD (Economics), Professor, Professor of the Department of Economics, Management and Territory Management of a Separate Structural Subdivision, Institute of Innovative Education Kyiv National University of Civil Engineering and Architecture (4 Osvity Str., Kyiv, 03037, Ukraine)*
E-mail: *denysiuk.olga79@gmail.com*
ORCID: *https://orcid.org/0000-0001-5294-4933*

Researcher ID: *MTJ-5497-2025*
Scopus Author ID: *58317197000*

Makatora Dmytro A. *– PhD (Engineering), Associate Professor, Associate Professor of the Department of Machines and Units for Printing Production of the Educational and Scientific Publishing and Printing Institute, National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» (37 Beresteiskyi Ave., Kyiv, 03056, Ukraine)*
E-mail: *makatora_d@ukr.net*
ORCID: *https://orcid.org/0000-0002-1909-900X*
Researcher ID: *AHB-4079-2022*
Scopus Author ID: *58572089000*

УДК 691:006.83:338.45
JEL: L74; F15; O52; Q01; M11; K23

Михалко А. О., Кубанов Р. А., Денисюк О. В., Макатьора Д. А. Нормативно-технічні основи використання будівельних матеріалів в ЄС: обґрунтування економічної ефективності інтеграції стандартів і регламентів у проєктній діяльності архітектурно-будівельної компанії

У статті досліджуються нормативно-технічні основи використання будівельних матеріалів у Європейському Союзі та обґрунтовується економічна ефективність інтеграції європейських стандартів і регламентів у діяльність архітектурно-будівельних компаній України. Показано, що сучасний розвиток галузі відбувається в умовах глибокої інтеграції до європейського економічного простору, проте існує розрив між чинними національними стандартами та вимогами ЄС. Це ускладнює вихід українських компаній на міжнародний ринок і знижує їхню конкурентоспроможність. У роботі проаналізовано еволюцію європейської політики у сфері будівництва, починаючи з «Нового підходу» 1985 року, який заклав основи спрощення доступу до внутрішнього ринку та переходу від детальних технічних специфікацій до загальних вимог. Визначено, що подальший «Глобальний підхід» доповнив ці принципи, зосередивши увагу на оцінці відповідності продукції стандартам. Це створило сприятливі умови для інновацій, розвитку конкурентного середовища та формування єдиної системи вимог до будівельних матеріалів. Особливу увагу приділено ключовим стандартам ЄС: EN Eurocodes (EN 1990–1999), EU RegulationNo 305/2011 (CPR), EN 206 (Concrete), EN 771 (MasonryUnits), EN 13163 (Thermalinsulationproducts), EN 14081 (Timberstructures), EN 1090 (Steelstructures), EN 15804 (EnvironmentalProductDeclarations) та EN 13501 (Fireclassification). Вони визначають вимоги до міцності, довговічності, енергоефективності, екологічності та безпеки будівельних матеріалів. Для українських компаній їхнє впровадження означає не лише підвищення якості продукції, але й доступ до європейського ринку, участь у міжнародних тендерах та формування позитивного іміджу. У статті наведено приклади гармонізації стандартів ЄС з українськими ДСТУ, що вже охоплюють бетон, мурувальні вироби, теплоізоляцію, деревину, сталь, пожежну безпеку та екологічні декларації. Водночас підкреслено, що процес адаптації Eurocodes та CPR залишається неповним і потребує системного підходу. Відсутність єдиної дорожньої карти інтеграції стандартів призводить до хаотичних дій компаній, які не завжди усвідомлюють стратегічні вигоди від сертифікації, CE маркування чи екологічних декларацій. Методологічна основа дослідження ґрунтується на системному, порівняльному та економіко-аналітичному підходах. Використано методи контент-аналізу нормативних документів, експертних оцінок та case-study для аналізу практичних прикладів гармонізації. Застосовано статистичний аналіз даних щодо впровадження стандартів EN 206, EN 771, EN 1090 та EN 15804, що дозволило кількісно оцінити ефективність їх використання. Результати дослідження доводять, що інтеграція стандартів ЄС у діяльність архітектурно-будівельних компаній України забезпечує чотири ключові переваги: технічну якість (довговічність і безпека конструкцій), довіру клієнтів (прозорість процесів, CE маркування, екологічні декларації), доступ до ринку (участь у міжнародних тендерах і проєктах) та економічну вигоду (зниження витрат на обслуговування, оптимізація ресурсів, відповідність ESG вимогам). Таким чином, стандарти ЄС виступають не лише як формальна нормативна вимога, а як стратегічний інструмент розвитку, що дозволяє українським компаніям діяти впевнено, прозоро й ефективно на внутрішньому та зовнішньому ринку. Впровадження цих стандартів є економічно доцільним, репутаційно вигідним і стратегічно необхідним для сталого розвитку будівельної галузі України в умовах європейської інтеграції.

Ключові слова: *європейські стандарти (EN, Eurocodes, CPR), гармонізація ДСТУ та EN, будівельні матеріали, економічна ефективність, CE-маркування, екологічні декларації (EPD, EN 15804), пожежна безпека (EN 13501), енергоефективність будівель, архітектурно-будівельні компанії, проєктна діяльність, управління проєктами, інтеграція до ринку ЄС, конкурентоспроможність та міжнародні тендери.*

Табл.: *4.* ***Бібл.:*** *35.*

Михалко Анастасія Олегівна *– кандидат технічних наук, доцент, доцент кафедри механічної інженерії, Київський національний університет технологій та дизайну (вул. Мала Шияновська, 2, Київ, 01011, Україна)*
E-mail: *nastya_franchuk16@yahoo.com*
ORCID: *https://orcid.org/0000-0001-8203-7488*
Researcher ID: *GYD-4871-2022*

Кубанов Руслан Анатолійович *– кандидат педагогічних наук, доцент, доцент кафедри девелопменту та просторового планування, Відокремлений структурний підрозділ «Інститут інноваційної освіти Київського національного університету будівництва і архітектури» (вул. Освіти, 4, Київ, 03037, Україна)*
E-mail: *kubanov12@gmail.com*
ORCID: *https://orcid.org/0000-0002-0121-4858*
Researcher ID: *L-6715-2018*

Денисюк Ольга Василівна *– кандидат економічних наук, професор, професор кафедри економіки, менеджменту та управління територіями відокремленого структурного підрозділу, Інститут інноваційної освіти Київського національного університету будівництва і архітектури (вул. Освіти, 4, Київ, 03037, Україна)*
E-mail: *denysiuk.olga79@gmail.com*
ORCID: *https://orcid.org/0000-0001-5294-4933*
Researcher ID: *MTJ-5497-2025*
Scopus Author ID: *58317197000*

Макатьора Дмитро Анатолійович *– кандидат технічних наук, доцент, доцент кафедри машин та агрегатів поліграфічного виробництва Навчально-наукового Видавничо-поліграфічного інституту, Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського» (просп. Берестейський, 37, Київ, 03056, Україна)*
E-mail: *makatora_d@ukr.net*
ORCID: *https://orcid.org/0000-0002-1909-900X*
Researcher ID: *AHB-4079-2022*
Scopus Author ID: *58572089000*

The contemporary development of Ukraine's construction industry takes place under conditions of deep integration into the European economic and regulatory space. At the same time, a significant gap remains between the existing national standards and the requirements of the European Union, which complicates the entry of Ukrainian companies into the international market. The problem lies not only in the formal absence of full harmonisation of the regulatory and technical framework, but also in an insufficient understanding of the economic efficiency of implementing European standards in project activities. Many enterprises perceive standards as an additional administrative burden, whereas in reality they function as instruments for cost optimisation, increasing the durability of structures, and building customer trust.

European experience demonstrates that the implementation of the Eurocodes system, the CPR regulation, and EN standards (EN 206, EN 771, EN 1090, EN 15804, EN 13501, etc.) ensures not only technical quality but also creates economic and reputational advantages. For Ukraine, the issue of adapting these regulations in the form of harmonised DSTU standards is particularly relevant; however, this process remains fragmented and requires a systemic approach. The absence of a unified roadmap for standards integration leads to situations in which companies often act chaotically, without recognising the strategic benefits of certification, CE marking, or environmental declarations.

The problem is further aggravated by an insufficient level of personnel training and weak institutional support for harmonisation processes. This creates risks for the competitiveness of Ukrainian companies seeking to participate in international tenders and projects. At the same time, global trends in "green construction" and ESG-oriented investments require companies to comply with environmental standards, which constitutes an additional challenge.

Thus, a complex problem arises: how to ensure the effective integration of EU regulatory and technical standards into the activities of Ukrainian architectural and construction companies, substantiate their economic feasibility, and create conditions for the sustainable development of the sector. Addressing this problem requires systemic analysis, methodological justification, and practical recommendations that will allow standards to be transformed from a formal requirement into a strategic instrument for development and competitive advantage.

The European regulatory and legal evolution in construction demonstrates a shift from detailed technical specifications to harmonised performance requirements, which simplified access to the internal market and accelerated harmonisation [20]. Studies identify the key role of the "New" and "Global" Approaches: the former established a framework of general requirements for product categories, while the latter institutionalised conformity assessment as the basis of market trust [21]. This shifted the emphasis from national norms to unified standards for construction materials, increasing regulatory transparency and predictability. As a result, a coherent system has been formed that supports innovation, quality, and competitiveness in the sector.

Contemporary research shows that the implementation of harmonised EU standards reduces transaction costs, decreases claims, and increases the durability of structures [24]. Companies obtain direct financial benefits through optimisation of material life cycles (especially concrete under EN 206) and through reduced operating costs due to thermal insulation requirements (EN 13163) [26; 27]. In addition, compliance with the CPR and CE marking opens access to international tenders, where transparency and certification requirements are fundamental [25; 28]. The economic effect is reinforced by ESG-oriented practices: EPDs under EN 15804 generate reputational advantages and facilitate investment attraction [29].

Studies on EN 206 focus on the combination of economic and environmental efficiency through the management of composition, strength, and durability of concrete [26]. Research on EN 771 and EN 13163 emphasises the role of geometric stability, thermal conductivity, and material resistance in achieving building energy efficiency [14; 27]. In the field of structural timber (EN 14081), emphasis is placed on strength grading, moisture control, and marking as prerequisites for market access [16; 33]. Fire safety under EN 13501 is considered not only as a technical

requirement but also as a factor in reducing insurance risks and increasing client confidence [19; 30].

Studies on the CPR (EU 305/2011) demonstrate that CE marking and the declaration of performance are key to the legal circulation of products within the EU [12; 28]. For metal structures (EN 1090), certification is directly associated with the expansion of sales geography and participation in international projects [17; 32]. Research also indicates that the integration of EPDs into supply chains increases transparency and manageability of environmental impacts [18; 29]. Taken together, this forms a "market package" of requirements that transforms compliance with standards into a strategic advantage.

A review of Ukrainian sources records the gradual adaptation of key EN standards in the form of harmonised DSTU standards for concrete, masonry products, thermal insulation, timber, steel, fire safety, and environmental declarations [1–10; 22; 23]. The Eurocodes are being translated and implemented in stages, forming a methodological basis for design according to European rules [11; 25]. At the same time, the full adaptation of the CPR is still ongoing, leaving room for institutional and market improvements [12]. The general trend is a shift from formal compliance to practical integration into company processes, including personnel training and the updating of quality systems [34; 35].

The methodological framework of the study is based on a combination of systemic, comparative, and economic-analytical approaches. The systemic approach makes it possible to consider EU regulatory and technical standards as an integrated structure encompassing legal, technical, and economic aspects of the use of construction materials. The comparative approach is applied to analyse the correspondence between European standards (EN, CPR, Eurocodes) and Ukrainian harmonised DSTU standards, which allows the degree of integration to be determined and gaps in the regulatory framework to be identified. The economic-analytical approach ensures the assessment of the effectiveness of standards implementation through indicators such as cost reduction, increased durability of structures, and expanded access to the EU market.

The study employs methods of content analysis of regulatory documents and scientific publications, which makes it possible to systematise key provisions and trends in the development of European construction policy. The method of expert assessments is used to determine the practical significance of standards in the activities of architectural and construction companies, particularly with regard to CE marking, environmental product declarations (EPD), and fire safety. The case study method is applied to analyse specific examples of standards harmonisation in the activities of Ukrainian companies, demonstrating tangible economic and reputational benefits.

Statistical analysis of data on the implementation of EN 206, EN 771, EN 1090, and EN 15804 is also applied, enabling a quantitative assessment of the effectiveness of their use. To generalise the results, the method of synthesis is used, integrating technical, legal, and economic aspects into a unified concept of EU standards integration.

Thus, the methodological framework of the study ensures a comprehensive approach to examining EU regulatory and technical standards, their harmonisation with Ukrainian DSTU standards, and the assessment of economic efficiency for architectural and construction companies. It allows not only the description of integration processes but also the substantiation of their practical value for sectoral development and entry into the international market.

The purpose of the study is to substantiate the economic efficiency of integrating regulatory and technical standards and regulations of the European Union into the project activities of Ukrainian architectural and construction companies. The research is aimed at identifying the practical advantages of harmonising Ukrainian DSTU standards with European EN standards and the CPR, as well as determining their impact on the quality of construction materials, the durability of structures, and the competitiveness of companies.

The objectives of the study are to demonstrate that the implementation of EU standards not only ensures compliance with international requirements but also creates economic benefits through reduced maintenance costs, optimisation of the life cycle of materials, access to international tenders, and the formation of a positive corporate image. Particular emphasis is placed on the analysis of standards such as EN 206 (concrete), EN 771 (masonry units), EN 1090 (steel structures), EN 15804 (environmental declarations), and EN 13501 (fire safety), which have the greatest impact on the economic and reputational performance of companies.

Thus, the aim of the study is to establish a methodological and practical basis for adapting Ukrainian architectural and construction companies to European norms, which will enhance product quality, strengthen customer trust, and ensure the sustainable development of the sector under conditions of integration into the European market.

The evolution of European construction policy prior to the 1980s was aimed at eliminating barriers through the adaptation of national technical regulations. The primary emphasis was placed on harmonising standards for the production of technological

products rather than on establishing performance levels. This process encountered a number of difficulties, in particular due to the excessive technicality of legislation, which had to comply with specific requirements for each product category, as well as the requirement for unanimous approval by the Council of the European Union for the adoption of directives on technical harmonisation.

An important milestone was the adoption in May 1985 of Resolution No. 85/C136/01, which defined the "New Approach" to technical harmonisation and standards. This approach was aimed at simplifying access to the internal market and introducing flexible legislation that made it possible to move from detailed technical specifications to the definition of essential requirements for product categories. This created favourable conditions for innovation and the development of a competitive environment. The implementation of the New Approach and the subsequent Global Approach in the field of technical harmonisation and standardisation of construction materials resulted in a shift in emphasis from national technical norms towards the creation of a unified, standardised set of requirements for construction materials. The Global Approach complemented these principles by focusing on the conformity assessment of products with these standards. This became the basis for the advancement of European legislation in the construction sector, ensuring the establishment of an effective regulatory system that contributes to improving the quality of construction materials and the overall competitiveness of European industry [20–21].

According to P. Kryvoshein, there are approximately 500 standards in the EU that ensure compliance with the requirements of the main EU directives [22]. O.Stukalenko [23] examined the legal aspects; however, of greater interest in this study are the economic efficiency and construction-specific characteristics of key regulations. A more detailed analysis of EU standards is presented in Table 1.

Additional characterisation of the elements of the table.

- EN Eurocodes (EN 1990–1999). The European standards for structural design cover all major types of construction materials and structures, including concrete, steel, timber, and masonry [11]. They establish requirements for the strength, stability, and durability of buildings and structures. For Ukrainian companies,

Table 1

Key standards for the use of construction materials in the EU

Standard / Regulation	Scope of application	Key requirements	Practical value for Ukrainian companies
EN Eurocodes (EN 1990–1999)	Structural design of buildings and structures	Mechanical strength, stability, durability	Harmonisation of design solutions, access to the European market
EU Regulation No 305/2011 (CPR – Construction Products Regulation)	Marking and circulation of construction materials	CE marking, declaration of performance	Legal access of products to the EU market, transparency for clients
EN 206: Concrete – Specification, Performance, Production and Conformity	Concrete and concrete mixtures	Requirements for composition, strength, environmental performance	Improvement of quality and durability of structures
EN 771: Masonry Units	Bricks, blocks, masonry units	Geometry, strength, thermal conductivity	Compliance with energy efficiency and safety standards
EN 13163: Thermal insulation products	Thermal insulation materials (EPS, XPS)	Thermal conductivity, stability, environmental performance	Compliance with EU requirements for building energy efficiency
EN 14081: Timber structures	Structural timber	Strength grading, moisture content, marking	Use of certified timber, environmental sustainability
EN 1090: Execution of steel structures	Metal structures	Requirements for fabrication, welding, CE marking	Access to the EU market for steel structures
EN 15804: Environmental Product Declarations (EPD)	Environmental assessment of materials	Life cycle, environmental impact	Support for "green construction" principles and ESG standards
EN 13501: Fire classification of construction products	Fire safety	Classification of reaction to fire	Compliance with EU safety standards, risk reduction

the implementation of the Eurocodes means the harmonisation of design solutions with European standards and the opportunity to enter the international market.

- EU Regulation No. 305/2011 (CPR – Construction Products Regulation). This regulation defines the rules for the circulation of construction materials within the EU. The core requirement is the presence of CE marking and a declaration of performance [12]. This ensures transparency and compliance of products with European regulations. For Ukrainian manufacturers, it is the key to legal export and customer trust.
- EN 206: Concrete. This standard regulates requirements for the composition, production, and quality control of concrete. It defines parameters for strength, environmental performance, and durability [13]. The application of EN 206 makes it possible to ensure stable quality of concrete structures and compliance with modern energy-efficiency requirements.
- EN 771: Masonry Units. This standard applies to bricks, blocks, and masonry units. It establishes requirements for geometry, strength, and thermal conductivity of materials [14]. This is essential for achieving building energy efficiency and compliance with safety standards.
- EN 13163: Thermal insulation products. The standard regulates thermal insulation materials (EPS, XPS). The main requirements concern thermal conductivity, resistance to external influences, and environmental performance [15]. Its application enables the achievement of high energy-efficiency indicators, which is a priority in the EU.
- EN 14081: Timber structures. This standard applies to structural timber. It defines strength grading, moisture content, and marking rules [16]. This ensures the use of certified timber and supports environmentally sustainable construction practices.
- EN 1090: Steel structures. The standard regulates the manufacture and installation of steel structures. It includes requirements for welding, quality control, and CE marking [17]. For Ukrainian companies, this opens opportunities for supplying steel structures to the EU market.
- EN 15804: Environmental Product Declarations (EPD). This standard provides a framework for the environmental assessment of construction materials over their life cycle [18]. It allows the environmental impact of products to be determined and environmental declarations to be developed. It is an important instrument for "green construction" and compliance with ESG standards.
- N 13501: Fire classification of construction products. The standard establishes classes of reaction to fire for construction materials [19]. This is critical for ensuring fire safety and compliance with EU regulations.

The described standards form an integrated system of requirements for construction materials in the EU. For Ukrainian companies, their implementation means not only improved quality and safety, but also economic benefits through access to the European market and increased customer trust.

Harmonisation pathways: EU standards ↔ Ukrainian DSTU. Table 2 demonstrates the correspondence and harmonisation of the main regulatory documents in the field of construction materials. This makes it possible to identify which standards have already been adapted in Ukraine and which still require implementation.

Let us consider the features of harmonisation in more detail.

- EN Eurocodes (EN 1990–1999) [11] ↔ DSTU N B EN 1990–1999 [1]. European structural design standards cover concrete, steel, timber, masonry, and other materials. In Ukraine, they are being gradually translated and adapted as the DSTU N series. This creates a foundation for harmonising design solutions and enables Ukrainian companies to operate under unified rules together with European partners.
- EU Regulation No. 305/2011 (CPR) [12] ↔ DSTU B V.2.7-170:2008 [2] and other technical regulations. The CPR defines the rules for the circulation of construction products within the EU, with the core requirement being CE marking and a declaration of performance. In Ukraine, separate technical regulations are in force; however, the full adaptation of the CPR is still ongoing. This remains a key area for integration into the European market.
- EN 206: Concrete [13] ↔ DSTU B EN 206:2011 [3]. The standard establishes requirements for the composition, production, and quality control of concrete. The Ukrainian DSTU is a harmonised translation, which makes it possible to ensure product compliance with European norms and to increase the durability of structures.
- EN 771: Masonry Units [14] ↔ DSTU B EN 771 [4]. The European standard for masonry units (bricks, blocks, stone) defines geometric

Table 2

Harmonisation pathways: EU standards ↔ Ukrainian DSTU

EU standard / regulation	Scope of application	Ukrainian DSTU (harmonised or equivalent)	Harmonisation status
EN Eurocodes (EN 1990–1999)	Structural design	DSTU-N B EN 1990–1999 (series of Eurocodes translations)	Partially harmonised, implemented gradually
EU Regulation No 305/2011 (CPR)	Regulation of construction products, CE marking	DSTU B B.2.7-170:2008 and other technical regulations	Requires full adaptation; CE marking is not yet mandatory
EN 206: Concrete	Concrete and concrete mixtures	DSTU B EN 206:2011 "Concrete. Specification, performance, production and conformity"	Harmonised
EN 771: Masonry Units	Bricks, blocks, masonry units	DSTU B EN 771 (series of standards for masonry units)	Harmonised
EN 13163: Thermal insulation products	Thermal insulation materials (EPS, XPS)	DSTU B EN 13163:2012 "Thermal insulation products made of expanded polystyrene"	Harmonised
EN 14081: Timber structures	Structural timber	DSTU B EN 14081:2014 "Structural timber"	Harmonised
EN 1090: Steel structures	Metal structures	DSTU EN 1090:2015 "Execution of steel structures"	Harmonised
EN 15804: Environmental Product Declarations (EPD)	Environmental assessment of materials	DSTU ISO 14025:2019, DSTU EN 15804:2017	Harmonised
EN 13501: Fire classification of construction products	Fire safety	DSTU B EN 13501 (series of standards on reaction-to-fire classification)	Harmonised

parameters, strength, and thermal conductivity. The Ukrainian counterpart is harmonised, ensuring compliance with energy-efficiency and safety requirements.

- EN 13163: Thermal insulation products [15] ↔ DSTU B EN 13163:2012 [5]. This standard applies to thermal insulation materials (EPS, XPS). A harmonised standard is in force in Ukraine, enabling the achievement of high energy-efficiency indicators and compliance with EU requirements for "green construction".
- EN 14081: Timber structures [16] ↔ DSTU B EN 14081:2014 [6]. The standard regulates structural timber, including strength grading, moisture content, and marking. The Ukrainian standard is harmonised, facilitating the use of certified timber and the application of environmentally oriented construction principles.
- EN 1090: Steel structures [17] ↔ DSTU EN 1090:2015 [7]. This standard sets requirements for the manufacture and installation of steel structures, including quality control and CE marking. The Ukrainian DSTU is harmonised, opening opportunities for exporting steel structures to the EU market.
- EN 15804: Environmental Product Declarations [18] ↔ DSTU ISO 14025:2019 [8], DSTU EN 15804:2017 [9]. The standard defines the rules for the life-cycle-based environmental assessment of construction materials. The Ukrainian counterparts are harmonised, enabling the development of environmental product declarations (EPDs) and compliance with ESG standards.
- EN 13501: Fire classification of construction products [19] ↔ DSTU B EN 13501 [10]. This European standard establishes classes of reaction to fire for construction materials. The Ukrainian counterpart is harmonised, ensuring compliance with EU fire safety regulations.

Overall, Ukraine has already harmonised most key EU standards (concrete, masonry units, thermal insulation, timber, steel, fire safety, and environmental declarations). The Eurocodes are being implemented gradually but have not yet become a single mandatory system. The CPR (305/2011) requires further adaptation, as CE marking is not yet mandatory for Ukrainian manufacturers. Harmonisa-

tion of standards opens access to the European market for Ukrainian companies and enhances their competitiveness.

Although European standards are often perceived as a requirement at the level of state policy, their significance is far deeper and more practical. They are necessary not only for the country as a participant in international agreements, but also for each individual architectural and construction company seeking stable development, customer trust, and entry into new markets.

The implementation of EU standards is not merely a formality, but an economically sound decision that makes it possible to reduce maintenance costs and claims; improve the quality and durability of structures; ensure compliance with environmental and safety requirements; and gain access to international tenders and partnerships. Thus, EU standards become not an instrument of control, but a tool for development that enables companies to operate confidently, transparently, and efficiently in both domestic and external markets.

The economic efficiency of using key EU standards in the activities of an architectural and construction company is presented in Table 3.

The implementation of EU standards not only improves quality and safety, but also generates economic benefits, including reduced maintenance costs; access to new markets and tenders; increased trust from clients and partners; and compliance with environmental and ESG requirements.

Table 3

Economic efficiency of using EU standards in the activities of an architectural and construction company

EU standard	Scope of application	Economic efficiency	Practical benefit for the company
EN 206	Concrete	Reduction of repair costs, increased durability	Stable quality of structures, fewer claims
EN 771	Masonry units	Energy efficiency, reduced heat losses	Compliance with "green" standards, savings on heating
EN 13163	Thermal insulation	Reduction of operating costs	Improvement of the building energy-efficiency class
EN 14081	Timber	Use of certified raw materials, environmental sustainability	Access to environmental tenders, image of a responsible business
EN 1090	Steel	CE marking, access to the EU market	Expansion of sales geography, participation in international projects
EN 13501	Fire safety	Reduction of insurance risks, regulatory compliance	Improved safety, customer trust
EN 15804	Environmental declarations (EPD)	ESG compliance, participation in "green" tenders	Access to investors, reputational advantage

A strategic efficiency formula can be formulated as follows: the implementation of EU standards in the activities of an architectural and construction company ensures four key advantages – technical quality, customer trust, access to the European market, and economic benefits. In particular:

- Quality: European standards (EN 206, EN 771, EN 1090, etc.) guarantee stability, durability, and compliance with modern safety and energy-efficiency requirements.
- Trust: process transparency, CE marking, and environmental product declarations (EN 15804) build a positive corporate image and strengthen interaction with clients.
- Market: harmonisation with EU regulations opens opportunities to participate in international tenders and projects and to expand the geographical scope of operations.
- Efficiency: reduced maintenance costs, lower risks, and resource optimisation all contribute to improved financial performance.

This formula demonstrates that standards are not merely a regulatory requirement, but a tool for development, competitive advantage, and partnership-based trust.

For an individual architectural and construction company, it is particularly important to understand the algorithm for implementing EU regulations in the field of construction materials and the expected outcomes of these actions [34–35] (Table 4).

Let us consider the defined stages in more detail.

Table 4

Stages of EU regulatory implementation in construction materials within an architectural and construction company

Stage	Content	Key actions	Expected result
1. Analysis of the EU regulatory framework	Study of Eurocodes, CPR, EN standards	Review of requirements for concrete, steel, timber, thermal insulation, fire safety	Awareness of the gap between existing DSTU and European standards
2. Harmonisation with Ukrainian DSTU	Identification of relevant harmonised standards	Application of DSTU B EN 206, DSTU EN 1090, DSTU EN 15804, etc.	Legal compliance, preparation for certification
3. Adaptation of internal processes	Review of production and control technologies	Implementation of quality management systems, environmental declarations, CE marking	Risk reduction, increased transparency
4. Personnel training	Introduction to new requirements	Training on Eurocodes, fire safety, ESG standards	Increased competence and responsibility
5. Product certification	Official confirmation of compliance	Obtaining CE marking and environmental product declarations (EPD)	Legal access to the EU market
6. Integration into project activities	Application of standards in real projects	Design according to Eurocodes, use of certified materials	Improved quality and durability of structures
7. Economic and reputational benefits	Utilisation of harmonisation advantages	Participation in international tenders, cost reduction, customer trust	Increased competitiveness and enhanced corporate image

Stage 1. Analysis of the EU regulatory framework. The company begins by studying the key documents – Eurocodes, the CPR, and harmonised EN standards. This makes it possible to understand the requirements for concrete, steel, timber, thermal insulation, and fire safety, as well as to identify the gap between current Ukrainian regulations and European norms.

Stage 2. Harmonisation with Ukrainian DSTU. The next step involves identifying the relevant harmonised standards within the national system. The application of DSTU B EN 206, DSTU EN 1090, DSTU EN 15804, and other standards ensures legal compliance and creates a basis for product certification.

Stage 3. Adaptation of internal processes. The company reviews production technologies, quality control systems, and documentation procedures. Environmental product declarations, CE marking, and modern material testing methods are implemented. This reduces risks and increases operational transparency.

Stage 4. Personnel training. Employees undergo training on new requirements, including design according to the Eurocodes, fire safety, and environmental standards. This enhances team competence and fosters a culture of responsibility.

Stage 5. Product certification. The company obtains official confirmation of compliance in the form of CE marking and environmental product declarations (EPDs). This opens the way for legal entry into the EU market and increases customer confidence.

Stage 6. Integration into project activities. Standards are applied in real projects through design in accordance with the Eurocodes and the use of certified materials. This ensures quality, durability, and compliance with contemporary requirements.

Stage 7. Economic and reputational benefits. The final stage involves achieving tangible outcomes, including participation in international tenders, cost reduction, increased competitiveness, and the formation of a positive corporate image.

Thus, the implementation of EU regulations represents a sequential pathway from analysis to economic benefit, transforming standards from a formal requirement into a tool for company development. It can be clearly observed that the stages of EU regulatory implementation form a logical corporate development cycle: Analysis → Harmonisation → Adaptation → Training → Certification → Integration → Economic benefit.

Let us formulate generalised and practice-oriented recommendations for an architectural and construction company that will facilitate the integration of EU standards, enhance efficiency, and strengthen market positioning:

1. Conduct an audit of the regulatory framework: identify which European standards (EN 206, EN 1090, EN 15804, etc.) have already been harmonised in Ukraine; assess the compliance

of internal processes with current DSTU standards and EU requirements.

2. Implement harmonised standards: use certified materials in accordance with EN requirements; design structures in compliance with the Eurocodes to improve durability and safety.
3. Invest in personnel training: organise training on new regulations, fire safety, and environmental declarations; foster a culture of responsibility and technical competence.
4. Obtain CE marking and environmental product declarations (EPDs): this will open access to the European market, international tenders, and "green" projects, and will increase trust among clients and partners.
5. Integrate standards into project activities: apply certified materials at all stages – from design to installation; use BIM technologies to ensure transparency and effective control.
6. Communicate benefits to clients: explain that compliance with EU standards means not only quality, but also cost efficiency, safety, and environmental responsibility; create a dedicated website section describing certifications and standards.
7. Use standards as a branding instrument: position the company as a responsible, modern, and internationally oriented partner; emphasise compliance with ESG principles in corporate communications.

These recommendations will enable a company not merely to comply with requirements, but to transform standards into a source of competitive advantage, trust, and economic stability.

Next, a practical checklist for an architectural and construction company is proposed to assess readiness for implementing EU regulations in the field of construction materials. This checklist can be used, for example, as an internal control tool.

Checklist: Implementation of EU regulations in the activities of an architectural and construction company:

1. Analysis and planning: key EU standards (EN 206, EN 1090, EN 15804, Eurocodes, etc.) have been studied; an audit of compliance with current DSTU standards has been conducted; a harmonisation roadmap has been developed.
2. Harmonisation and adaptation: harmonised Ukrainian standards have been identified; internal technical regulations have been updated; new quality control procedures have been implemented.
3. Personnel training and preparation: training sessions on new regulations have been conducted; the team has been familiarised with CE marking and EPD requirements; internal guidelines and reference materials have been developed.
4. Certification and documentation: technical files for CE marking have been prepared; environmental product declarations (EPDs) have been issued; a compliance monitoring system has been established.
5. Practical integration: standards have been applied in real projects; certified materials have been used; BIM tools have been implemented to ensure transparency.
6. Communication and positioning: the website and presentation materials have been updated; compliance with ESG principles has been emphasised; the brand of a responsible business has been formed.

Most importantly, in our view, every employee should understand the simple guiding motto of change: "Standards are not limitations, but our tool for development, trust, and stability."

CONCLUSIONS

Based on the results of the study, several conclusions and generalisations can be drawn:

1. European standards and regulations (Eurocodes, the CPR, and the EN series) form an integrated regulatory framework that covers all key aspects of construction activities. They ensure high material quality, structural safety, and environmental sustainability of production. This creates a unified space for innovation and competitive development. For Ukrainian companies, this means the opportunity to operate according to rules that are understood and accepted at the international level.
2. The harmonisation of Ukrainian DSTU standards with EU regulations already covers most critical areas, including concrete, masonry units, thermal insulation, timber, steel, fire safety, and environmental declarations. This provides a foundation for integration into the European market and enables companies to meet contemporary requirements. At the same time, the process of translating and adapting the Eurocodes is still ongoing, which opens prospects for further development. Thus, harmonisation is not only a technical task, but also a strategic direction of economic policy.
3. The economic efficiency of implementing standards is reflected in reduced repair and maintenance costs, increased durability of structures, and compliance with energy-efficiency

requirements. This allows companies to optimise resources and reduce risks associated with building operation. In addition, standards promote environmentally responsible production, which aligns with current "green construction" trends. As a result, companies gain not only financial benefits but also reputational advantages.

4. The practical benefits for companies include access to international tenders, expansion of sales geography, and the formation of a positive corporate image. Compliance with EU standards increases trust among clients and partners, which is critically important for business development. Moreover, it opens opportunities for attracting investors oriented toward ESG principles. Thus, standards become an instrument not only of technical compliance but also of strategic company development.
5. The algorithm for implementing EU regulations (analysis → harmonisation → process adaptation → personnel training → certification →integration into projects → economic benefit) serves as a universal roadmap for architectural and construction companies. It enables the systematic implementation of change and the achievement of predictable results. Each stage has its own practical value and forms the basis for the next one. Ultimately, companies gain stability, transparency, and competitiveness.
6. EU standards are not merely a formal requirement, but a strategic development tool. They ensure technical quality, customer trust, market access, and resource efficiency. For companies, this means the ability to operate confidently and transparently in both domestic and external markets. In the long term, this contributes to sustainable development and integration into the European economic environment. ■

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Стаття надійшла до редакції / Received: 08.01.2026 р.
Статтю прийнято до публікації / Accepted: 22.01.2026 р.
Оприлюднено / Published: 25.02.2026 р.