VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

Eglė ŠIOŽINYTĖ

CONSISTENCY BETWEEN CONTEMPORARY BUILDING NORMS AND TRADITION IN VERNACULAR BUILDINGS

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Eglė ŠIOŽINYTĖ

ŠIANDIENINIŲ STATYBOS NORMŲ IR TRADICIJOS DERINIMAS ETNINĖS ARCHITEKTŪROS PASTATUOSE

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Introduction

Problem formulation. Vernacular architecture is an architectural heritage and it should be preserved or developed in the proper way. This is an important aim due to significance role of vernacular architecture as being legacy for future generations and reflection of the last centuries. Old buildings should be maintained properly in order to save their historical, architectural, engineering and other value. Construction of new buildings based on traditional features of old veracular architecture, also, should be valuable and communicate right message about current age. However, this aim is not always easily accessible. One of the reasons why it is hard to do this – incoherent and not enough regulated development.

Lithuanian vernacular architecture is an area that requires attention, as it faces the challenges of development. Old buildings have been decaying or not properly maintained and upgraded. New buildings based on traditional features of old vernacular architecture, also, have been not able to find the right way of their development. Natural development process was discontinued before a few decades.

Research relevance. In order to analyse problems related with upgrading of vernacular buildings or construction of new buildings based on traditional features of this architecture, there is the need to find eligible solutions, combining modern building codes and requirements for preservation of ethnic architectural heritage. It is necessary to achieve adequate quality requirements of living environment in dwellings.

There is a need to find compromise solutions while looking for balance between contemporary norms and tradition continuity. For effective decision making, it is necessary to develop the complex model, based on Multiple Criteria Decision Making theory.

After the comprehensive analysis of the situation, it is relevant to legalize the basic principles of combining the tradition continuity and contemporary norms in vernacular buildings when proposing to develop the Heritage Management Regulation of the Republic of Lithuania. The aim of the Regulation is to regulate upgrading process of old vernacular buildings. In the case of new buildings based on old traditional features, the Regulation should propose the actions that could help to control the chaotic development of vernacular architecture.

The object of the research is the combination of tradition and contemporary norms in residential vernacular buildings' construction and upgrading solu-

tions. The research is based on the case study of Lithuanian residential vernacular buildings.

Aim of the work is to develop complex model and basic criteria system to describe and evaluate vernacular architecture's development and to form the rational solutions for problematic situations, based on scientific decision-making methods.

Tasks of the work. In order to achieve the aim of the work, the following tasks are going to be solved:

1. To analyse scientific literature and legislation related to the development of vernacular architecture and identify the main problems and possible solutions. Also, to analyse scientific literature based on multiple criteria decision making theory applied in civil engineering and the potential to apply these techniques for solving the issues of vernacular architecture's development.
2. To identify the trends of Lithuanian vernacular architecture development, analysing rural tourism homesteads as an example. Identify the possible ways of development and make the SWOT analysis of them.
3. To create the complex model and basic criteria system for describing and evaluating vernacular architecture's development when looking for balance between tradition continuity and contemporary norms and for formulating the rational solutions for problematic situations on the basis of Multiple Criteria Decision Making theory, and, to adapt this model for solving residential vernacular architecture's upgrading issues caused by daylighting, thermal performance and building appearance problematic.
4. To offer recommendations for development of new Heritage Management Regulation of the Republic of Lithuania associated with upgrading and maintenance of residential and other type of vernacular buildings while seeking to improve the condition of old buildings. Also, propose the actions that could help to control the development of vernacular architecture in the case of construction of new buildings based on old traditional features.

Methodology of research. The thesis applies statistical and comparative analysis, multi-criteria decision-making methods (COPRAS, TOPSIS, TOPSIS Grey, WASPAS, AHP) and method of strategic analysis (SWOT).

Scientific novelty. While preparing this dissertation, the following results, which are new for civil engineering science, have been achieved:

1. The complex model is proposed, which can be used for solving the problematic issues of vernacular architecture's development. Model is eligible to evaluate various aspects such as architectural, engineering, technological, economical, ecological, social, cultural, etc. while seeking to find compromise solution.
2. The basic criteria system is created, which is suitable for new and renovated buildings' assessment while looking for balance between tradition continuity and contemporary norms.

Practical value. The proposed complex model can be applied in practice for old buildings upgrade and new buildings based on traditional features of old vernacular architecture. Model is suitable to evaluate separate parts of the building, also, the whole building. The proposed model is adapted for different ethnic heritage conservation zones due to its possibility evaluate legal aspects.

Recommendations are offered for development of new Heritage Management Regulation of the Republic of Lithuania associated with upgrade and maintenance of vernacular architecture while seeking to improve the condition of old buildings. Also, proposed the actions that could help to control the chaotic development of vernacular architecture in the case of construction the new buildings based on old traditional features.

Defended propositions

1. Compromise solutions based on scientific decision-making methods are required while looking for the consistency between contemporary building norms and saving traditional features of old vernacular architecture.
2. When preparing the compromise solutions for vernacular building management, consistency of interests of stakeholders should be evaluated by applying mathematical methods.
3. Rational management solutions of vernacular buildings can be accepted when the proposed complex model is applied, which is based on Multiple Criteria Decision Making theory.

Approval of work results. Seven scientific articles were published on topic of dissertation: two of them were published in the science journals included in the database of Thomson Reuters ISI Web of Science, one article was published in other peer-reviewed journal, four articles in international and national conference proceedings.

The scope of the scientific work. Dissertation consists of introduction, three chapters, general conclusions and a list of references. The total scope of the dissertation – 104 pages without annexes, 14 figures, 22 tables and 154 references.

1. Vernacular architecture's development tendencies and possibilities

Vernacular architecture is important in many aspects. In the process of studying its development we can see what kind of trends were in last ages. In scientific literature about vernacular architecture's development the statements are met that this architecture should be cherished. Also researchers declare that it is difficult to achieve this task in a proper way, because various important aspects should be evaluated and reached the consistency between few stakeholder concerns.

The first chapter of the dissertation contains of scientific literature and the legislation related with vernacular buildings analysis which reveals the importance, problems, possibilities, requirements and other information about the vernacular architecture's development.

Analyzing the real situation of Lithuanian vernacular architecture development it was noticed that there is not enough data about the situation. For this reason the research of rural architecture for tourism was made (2013). There were 320 rural farmsteads analyzed. These farmsteads were involved in a list of rural tourism association of Lithuania.

It is important to notice that Lithuanian vernacular architecture officially and legally is propagated in the protected areas of the country. In the rest part of the country there is no directional promotion of this type of architecture. Also noticed that vernacular architecture meets with problems in both areas, but the problems are quite different in protected areas and other territories.

Noticed tendencies are as follows: farmsteads that use some features of vernacular architecture are quite innovative; sometimes using the features borrowed from other countries, e.g. green roofs; proportions of the buildings not always match the proportions of traditional vernacular architecture; less decoration; new structures appeared, such as balconies; there is no solid style of rural architecture. Other group of buildings – imitated architecture – is not always a good copy of old vernacular architecture. Mostly these buildings look like a parody of previous traditional architecture. Also it is detected that regional vernacular architecture's features migrate to other regions, e.g. significant features of one region can be found in another, where these features were not promoted earlier.

In conclusion of the research of existing situation, there is no directional way of Lithuanian vernacular architecture's development. Analysed buildings are quite different and chaotic; there is no high quality in their development. Especially the appearance is the key problem for new buildings based on vernacular architecture features.

Meanwhile, buildings in protected areas of Lithuania meet with specific problems. The reglamentation of external appearance of the building is quite strict. The main problem is related with seeking for balance of tradition continuity and satisfying contemporary norms. There is quite difficult to satisfy architectural regulations for buildings in protected areas and regulations related with indoor daylighting.

The analysis of foreign vernacular architecture showed that it is possible to maintain traditional features of this architecture without big problems. United Kingdom, Ireland, Scandinavian countries preserved their architecture's features and still are continuing them in new buildings. The process of development occurs naturally there. It is identified that some of the countries such as Netherlands, Denmark experiment with their rural buildings' appearance, but the tendencies are quite visible: these buildings create new modern style, also maintain some basic traditional features of their countries; the style is quite clear and solid. Some of the mentioned countries are more conservative, while the others make compromises as concerns features that could be changed or forgotten.

The main problem is how to reach contemporary building norms without a negative impact to architectural heritage. The compromise solutions should be made.

After the analysis of multiple criteria decision making theory applied in civil engineering it was found that this theory can be effectively applied for solving the problematic issues of vernacular architecture's development and finding the compromise solution between tradition continuity and satisfying contemporary norms.

2. Modelling the consistency between tradition and contemporary requirements in old and new buildings

When talking about sustainable development of vernacular architecture, it is clear that old vernacular architecture naturally embodies principles of sustainable development such as close relation with nature, healthy environment; building materials are mostly local, natural, from renewable sources. However, nowadays these buildings do not satisfy some important parameters of sustainable development which have significance role for sustainable development of architecture. Old vernacular buildings frequently do not satisfy some of the

norms for contemporary buildings, such as daylighting and/or thermal performance requirement (energy aspect). Buildings consume a lot of energy. Also, the quality of living environment not always is satisfied. Modernization of these buildings can help to reduce energy consumption. But in this case we face the problem that commonly used modernization solutions are hardly compatible with preservation of traditional vernacular buildings' appearance. In this case we can leave everything as it is or make minimal interventions for buildings and don't satisfy contemporary norms and quality of living environment. In the other case we can try to find compromise solutions while looking for the balance between tradition saving and satisfying contemporary building norms.

The construction of new buildings based on traditional features of vernacular architecture, also, meet problems. Not always is clear how to find the consistency between tradition and today's needs in a proper way. It often reveals in external appearance of the building.

At first in the second chapter of the dissertation is noted that vernacular architecture develops (natural process) or can be developed (not natural process) in a few ways/directions. Which way/direction is the best need to be analysed in detail. Four possible ways/directions of vernacular architecture's development are suggested: conservative, innovative, conservative + innovative, alternative.

Also, the SWOT (strengths-weaknesses-opportunities-threats) analysis of each way/direction was made. Based on SWOT analysis it can be concluded that every of suggested vernacular architecture's development ways/directions have their advantages and disadvantages. All of these can be the guides for searching the right way/direction for vernacular architecture's preservation.

In the dissertation's second chapter the complex model for vernacular architecture development's assessment, which is based on multiple criteria decision making theory, is suggested (Fig. 1). The complex model can be used for solving the problematic issues of vernacular architecture's development. Model is eligible to evaluate various aspects such as architectural, engineering, technological, economical, ecological, social, cultural, etc. while seeking to find compromise solution. The proposed model is adapted for different ethnic heritage conservation zones due to its possibility to evaluate legal aspects.

Model consist of seven stages: 1) identification of vernacular architecture's importance and position in country's architectural and historical context (collection of information); 2) identification of criteria for problems' assessment (creation of basic criteria system); 3) identification of development possibilities (answering the questions related with intention to find the way/direction for architecture's development, e.g. conservation, re-use, upgrading, demolishing and formulating the problem); 4) choice of development way/direction

(formulating possible alternative solutions of the problem; choosing the criteria from the basic criteria system, depending on type of the problem; finding the values for criteria); 5) expert multicriteria assessment of formulated problem (setting relative significances of criteria; problem's evaluation using MCDM methods; ranking the alternatives); 6) decision making (ranking the alternatives and selecting the best one); 7) checking the ranked alternative's compatibility with institutions that are responsible for building construction.

Also, in the dissertation the basic quantitative and qualitative criteria system for vernacular architecture development's assessment is presented. Criteria system is based on consistency between four components: architectural heritage, requirements (building norms), energy and quality of living environment. Basic criteria system is presented on Table 1.

Table 1. Basic criteria system

Basic components	Criteria
Architectural / Construction	Describing building properties: ▪ form ▪ proportion ▪ height ▪ building area ▪ roof and wall ratio (wall height to the eaves and ridge) ▪ decorative elements ▪ aesthetics Describing buildings' constructions and appearance of the whole building: *Roof:* ▪ type ▪ slope ▪ covering ▪ colour *Walls:* ▪ facing (material) ▪ colour *Windows:* ▪ size ▪ division ▪ material ▪ colour

End of Table 1

	Doors: ▪ size ▪ material ▪ ornamentation ▪ colour *Foundation:* ▪ material
Engineering / Technical	Thermal characteristics Indoor daylighting characteristics
Legal	Satisfying building regulations Satisfying regulations for buildings in protected areas Satisfying heritage management regulations
Economical / Ecological	Energy saving Environmental impact Economics Ecology
Cultural / Social	Preservation of vernacular architecture Crafts propagation
Inovation / Other	Reflection of the period Modern solutions Comfort

Several MCDM methods are applied in the dissertation for searching rational solution of the problem: AHP, COPRAS, TOPSIS, TOPSIS Grey, WASPAS. AHP was used for evaluation of relative significances of criteria. COPRAS, TOPSIS and WASPAS were chosen for their suitability to evaluate problems with crisp information. TOPSIS Grey method was chosen by its suitability for problem solving with uncertain information, expressed in intervals.

Methods were chosen for solving specific problems, described in third chapter. For other problems the different methods can be used.

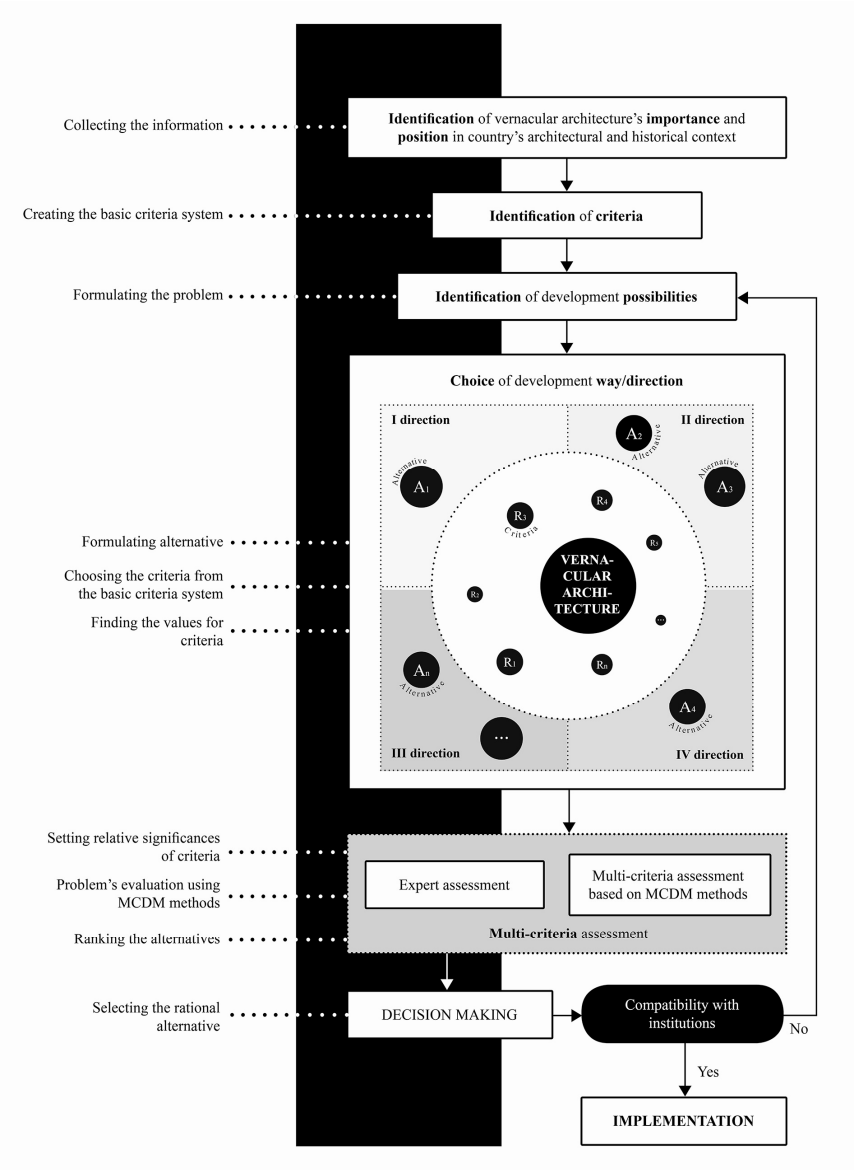

Fig. 1. Complex model for assessment of vernacular architecture development

3. Assessment of consistency between vernacular architecture's continuity and contemporary requirements

In the dissertation's third chapter two case studies about vernacular buildings' upgrade are presented. Problems were solved applying the complex model for assessment of vernacular architecture development and basic criteria system that are presented in dissertation's second chapter.

In the first case study the indoor daylighting problems in Lithuanian vernacular architecture are analysed. After the analysis of how much the real indoor daylighting situation in old vernacular dwellings is worse than the situation which should be when the building is constructed by applying contemporary norms, the results showed that all analysed buildings do not satisfy norms required for building regulations. The maximum difference between the minimal required and existing window glazed surface area of the room is about 4 times. This means that the window glazed surface area should be enlarged about 4 times when trying to satisfy contemporary norms. But it is not always possible to reach this condition.

When modelling the situation with the aim to improve the indoor daylighting parameters in vernacular buildings, five possible variants were proposed: 1) increasing the size of windows while maintaining typical traditional proportions; 2) increasing the size of windows by changing the proportions of window height and width; 3) increasing the quantity of windows; 4) using the new glass structures for building facades, as much as possible trying to maintain the traditional appearance of vernacular architecture; 5) using the new glass structures for building facades, more or less changing the traditional appearance of vernacular architecture. After the multiple criteria analysis of a particular object applying COPRAS, TOPSIS and WASPAS methods, it was found that the rational solution of improving daylighting and saving traditional features of vernacular architecture involves using new glass structures, such as large glazed surface area windows, especially in the Southern facade of the building, that can be visible or partially hidden, e.g. recessed and sub-divided. The other alternatives, such as increasing the size or quantity of windows, are almost similar (differ about 5–8 percent) and fall behind from the rational solution from 29 to 41 percent.

In the second case study which is the continuous work, and closely related with the first case study, multiple criteria approach was proposed for assessment of the whole building (not for one specific part of the building as in many other researches). The aim of the research was to find the best compromise solution for effective vernacular architecture's change when seeking to improve daylighting and thermal performance parameters and save the traditional appearance of the building. 9 alternatives were evaluated by experts according to

10 criteria. The results of the multiple criteria assessment applying TOPSIS Grey method showed that the rational variant of building's modernisation is when the small interventions to the building's external appearance are made seeking to improve thermal performance and daylighting characteristics. For the analysed object, thermal insulation was added inside the room of the building and windows were increased, maintaining their typical traditional proportions.

Comparing the results of the both case studies, it was concluded that evaluation of the specific part of the building, e.g. windows, is not the same as the complete evaluation of the whole building. Modern window solution was the best variant when alternatives for solving daylighting problem were ranked (in first case study). In the second case study after comprehensive analysis according to experts' (10 architectural engineers and 6 civil engineers) opinion and applying AHP method it was observed that the daylighting parameters were less important when the whole building was evaluated. According to their opinion tradition is much important than current norms when analysing vernacular buildings' modernization.

It can be assumed that it is not enough to evaluate separate parts of a building, even using a number of criteria for analysis, when making important decisions, such as vernacular architecture's change. It is suggested to evaluate upgrading of the whole building simultaneously and using multiple criteria approach. Also, every evaluated building should always be considered individually due to its different parameters (situation in the area, architecture, construction, etc.).

In the dissertation's third chapter also the recommendations are offered for development of a new Heritage Management Regulation of the Republic of Lithuania, associated with upgrade and maintenance of vernacular architecture while seeking to improve the condition of old buildings. Also, the actions are proposed that could help to control the chaotic development of vernacular architecture in a case of construction new buildings based on old traditional features.

General conclusions

1. After the analysis of literature it was concluded that the development of vernacular architecture must be continued and inevitably compromise decisions should be made which traditional features of old vernacular architecture can be saved, which can be changed or lost. However, there are not enough Recommendations on how to deal with this.
2. After the analysis of buildings related to continuity of vernacular architecture and analysis of legislation based on requirements for build-

ing construction, it was found that the reglamentation of preservation is insufficient and the development of Lithuanian vernacular architecture is chaotic. The need of scientific research leading to creating recommendations for vernacular architecture assessment and mangement has been identified.

3. After the analysis of multiple criteria decision making theory applied in civil engineering, it was found that this theory can be effectively applied for solving the problematic issues of vernacular architecture's development and finding the compromise solution between tradition continuity and satisfying contemporary norms.
4. Four vernacular architecture's development ways/directions were suggested: conservative, innovative, conservative + innovative, alternative. After SWOT analysis it can be concluded that it is quite difficult to decide which way/direction is the best. For the precise ranking the proposed SWOT method could be applied jointly with Multiple Criteria Decision Making methods for evaluating alternative decisions.
5. The complex model based on MCDM theory is created for describing and evaluating vernacular architecture's development. The solutions for problematic situations can be formulated and rational building construction and upgrading variants can be found applying the model.
6. The basic criteria system is formed, which includes such aspects as saving architectural heritage, satisfying contemporary building norms, energy saving, quality of living environment. The proposed criteria system allows finding compromise solution for building development applying MCDM methods.
7. Consistency of interests of stakeholders, that took part in decision making when preparing compromise solutions, was evaluated by mathematical methods. It was found that in spite of some differences in stakeholders' opinion, consistency coefficient not exceeded 10 percent, i.e. criterion of consistency was sufficient to make objective decisions.
8. Rational solutions ensuring consistency between engineering and architectural issues can be achieved after applying the proposed complex model for solving residential vernacular architecture's upgrading issues dealing with daylighting, thermal performance and building appearance problematic.
9. Recommendations for creating the Heritage Management Regulation of the Republic of Lithuania were offered for seeking to improve the condition of old vernacular buildings and to save traditional features. Modern solutions must meet the requirements of the authenticity and

ensure the quality of interventions. If there are reasonable problems that hinder fully satisfy the regulations, there should be the aim to satisfy these requirements in maximal way as possible. It is suggested to use the proposed complex model for finding compromise solution.

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ŠIANDIENINIŲ STATYBOS NORMŲ IR TRADICIJOS DERINIMAS ETNINĖS ARCHITEKTŪROS PASTATUOSE

Problemos formulavimas. Etninės architektūros pastatai yra vertingas paveldas, kuriam reikalingas ypatingas dėmesys, nes tai praėjusių kartų palikimas, atskleidžiantis laikmečio, kai jie buvo statomi, statybos ir kitas gyvenimo tendencijas. Senieji pastatai turėtų būti tinkamai prižiūrimi, kad išsaugotų savo istorinę, architektūrinę, inžinerinę ir kt. vertę, o naujų pastatų statyba, etninės architektūros pagrindu (tęsiant tradiciją), taip pat turėtų būti vertinga, perduodanti tinkamą palikimą ateinančioms kartoms. Tačiau, šis tikslas ne visada yra lengvai pasiekiamas ir viena iš priežasčių, kodėl tai sunku padaryti – nenuoseklus, nekryptingas ir nepakankamai reglamentuotas statybos vystymas(-is), išlaikant etninės architektūros savybes.

Lietuvių etninės architektūros pastatai – tai sritis, kuriai reikalingas dėmesys, nes susiduria su vystymo(-si) problemomis. Senieji pastatai nyksta arba, dažnu atveju, yra netinkamai prižiūrimi bei atnaujinami, o nauji pastatai, grįsti etninės architektūros bruožais, taip pat neranda savo kelio, kuris buvo pamestas dėl prieš kelis dešimtmečius nutrūkusio natūralaus, nuoseklaus vystymosi, nepakankamo teisinio ir techninio reglamentavimo.

Darbo aktualumas. Norint kryptingai spręsti klausimus, susijusius su senų pastatų atnaujinimu ar naujų pastatų statyba, tęsiant etninės architektūros tradiciją, reikia rasti tinkamus sprendimus, derinant šiuolaikinių statybos normų ir etninio architektūros paveldo išsaugojimo reikalavimus. Gyvenamojoje statyboje būtina pasiekti atitinkamus gyvenimo kokybės reikalavimus.

Derinant šiuolaikinius reikalavimus ir tradicijos tęstinumą, tenka ieškoti kompromisinių sprendimų. Efektyviems sprendimams priimti, reikia parengti kompleksinį sprendimų priėmimo modelį, pagrįstą sprendimų priėmimo pagal daugelį kriterijų teorija.

Atlikus kompleksinę situacijos analizę, pagrindinius tradicijos ir šiandieninių normų derinimo principus, etninės architektūros pastatų sprendimuose, aktualu įteisinti, pasiūlant parengti LR Paveldo tvarkybos reglamentą, kuris

reglamentuotų etninės architektūros gyvenamųjų ir kitų pastatų atnaujinimo ir tvarkybos reikalavimus, siekiant pagerinti senosios architektūros būklę ir tenkinti šiandieninius poreikius, pasiūlyti veiksmus (kelią), kuriuos atlikus, galima būtų bent iš dalies suvaldyti chaotišką lietuvių etninės architektūros vystymą(-si), naujos statybos atveju.

Tyrimų objektas – tradicijos ir šiandieninių normų derinimas etninės architektūros gyvenamųjų pastatų statybos bei atnaujinimo sprendimuose (Lietuvos etninės architektūros gyvenamųjų pastatų pavyzdžiu).

Darbo tikslas – sudaryti kompleksinį modelį bei bazinę rodiklių sistemą etninės architektūros pastatų vystymui(-si) aprašyti ir vertinti, probleminių situacijų galimiems sprendimo būdams suformuoti ir racionaliems sprendimams rasti, pagrįstą moksliniais sprendimų priėmimo metodais.

Darbo uždaviniai

1. Atlikti mokslinės literatūros ir teisės aktų analizę, nustatant etninės architektūros raidos pagrindines problemas bei jų sprendimo galimybes. Taip pat atlikti mokslinės literatūros analizę, susijusią su daugiatikslių sprendimų priėmimo metodų taikymu statybos srityje bei galimybėmis taikyti šiuos metodus, sprendžiant etninės architektūros raidos klausimus.
2. Nustatyti etninės architektūros vystymo(-si) tendencijas Lietuvoje (kaimo turizmo sodybų pavyzdžiu). Išskirti vyraujančias kryptis ir atlikti jų SSGG (SWOT) analizę.
3. Remiantis sprendimų priėmimo pagal daugelį kriterijų teorija ir ieškant darnos tarp senųjų tradicijų išlaikymo ir šiandieninių poreikių tenkinimo, sudaryti kompleksinį modelį etninės architektūros pastatų vystymui(-si) aprašyti ir vertinti, probleminių situacijų galimiems sprendimo būdams suformuoti ir racionaliems sprendimams rasti. Disertacijoje siūlomą kompleksinį modelį pritaikyti, sprendžiant etninės architektūros gyvenamųjų pastatų natūralaus apšvietimo gerinimo, pastatų energinių savybių gerinimo ir fasadų tradicinių bruožų išsaugojimo klausimus.
4. Pasiūlyti rekomendacijas naujam LR Paveldo tvarkybos reglamentui sukurti, siekiant pagerinti senosios architektūros gyvenamųjų ir kitų pastatų būklę bei tenkinti šiandieninius poreikius. Taip pat pateikti pasiūlymus, reglamentuojančius lietuvių etninės architektūros vystymą(-si), naujos statybos atveju.

Tyrimų metodika. Darbe taikoma statistinė ir lyginamoji analizė, daugiatikslių sprendimų priėmimo metodai (COPRAS, TOPSIS, TOPSIS Grey, WASPAS, AHP), strateginės analizės metodas (SSGG (SWOT)).

Darbo mokslinis naujumas. Rengiant disertaciją buvo gauti šie statybos inžinerijos mokslui nauji rezultatai:

1. Pasiūlytas kompleksinis modelis, kuriuo vadovaujantis, galima nagrinėti etninės architektūros pastatų vystymo(-si) klausimus, įvertinant daugelį aspektų (architektūrinių, konstrukcinių, technologinių, ekonominių, ekologinių, socialinių, kultūrinių ir kt.) ir ieškant kompromisinio sprendimo.
2. Sudaryta bazinė rodiklių sistema naujų ar rekonstruojamų statinių galimiems sprendimams vertinti, siekiant darnos tarp tradicijos išlaikymo ir šiandieninių poreikių tenkinimo.

Darbo rezultatų praktinė reikšmė. Pasiūlytas kompleksinis modelis gali būti taikomas praktikoje senų pastatų atnaujinimo bei naujų pastatų statybos, pagal senosios etninės architektūros bruožus, atveju. Modelis tinka vertinti pastato visumą arba atskiras jo konstrukcines dalis. Modelis pritaikytas įvairioms etninio paveldo saugojimo zonoms, dėl galimybės vertinti teisinius aspektus.

Pasiūlytos rekomendacijos naujam LR paveldo tvarkybos reglamento sukūrimui, susijusiam su senų lietuvių etninės architektūros pastatų atnaujinimu bei tvarkyba, ir pasiūlyti veiksmai, kuriuos atlikus, galima būtų suvaldyti chaotišką lietuvių etninės architektūros vystymą(-si) (naujos statybos atveju).

Ginamieji teiginiai

1. Ieškant darnos tarp dabartinių norminių statybos reikalavimų ir būdingų etninės architektūros bruožų išlaikymo, reikalingi kompromisiniai sprendimai, pagrįsti moksliniais sprendimų priėmimo metodais.
2. Rengiant etninės architektūros pastatų tvarkybos kompromisinius sprendimus, sprendimo priėmime dalyvaujančių suinteresuotų grupių interesus reikia įvertinti taikant matematinius metodus nuomonių suderinamumui nustatyti.
3. Racionalius etninės architektūros pastatų tvarkybos sprendimus galima priimti taikant kompleksinį modelį, parengtą sprendimų priėmimo pagal daugelį kriterijų metodų pagrindu.

Darbo rezultatų aprobavimas. Disertacijos tema yra publikuoti septyni moksliniai straipsniai, iš kurių du paskelbti *ISI Web of Science* leidiniuose (Šiožinytė and Antuchevičienė 2013, Šiožinytė *et al*. 2014), vienas – recenzuojamame

mokslo žurnale, įtrauktame į Lietuvos mokslo tarybos (*LMT*) patvirtintas duomenų bazes (Keizikas *et al.* 2012), vienas – tarptautinės konferencijos medžiagoje (Šiožinytė and Antuchevičienė 2014a), trys – Lietuvos jaunųjų mokslininkų konferencijų medžiagose (Šiožinytė 2012; Šiožinytė 2013; Šiožinytė and Antuchevičienė 2014b).

Darbo apimtis. Disertaciją sudaro įvadas, trys skyriai ir rezultatų apibendrinimas. Taip pat yra 4 priedai. Darbo apimtis yra 104 puslapiai, neskaitant priedų, tekste panaudotos 44 numeruotos formulės, 14 paveikslų ir 22 lentelės. Rašant disertaciją buvo panaudoti 154 literatūros šaltiniai.

Įvadiniame skyriuje aptariama tiriamoji problema, darbo aktualumas, aprašomas tyrimų objektas, formuluojamas darbo tikslas bei uždaviniai, aprašoma tyrimų metodika, darbo mokslinis naujumas, darbo rezultatų praktinė reikšmė, ginamieji teiginiai. Įvado pabaigoje pristatomos disertacijos tema autoriaus paskelbtos publikacijos ir pranešimai konferencijose bei disertacijos struktūra.

Pirmasis skyrius skirtas literatūros ir esamos situacijos analizei. Jame pateikta literatūros, susijusios su etninės architektūros vystymo(-si) ypatumais bei MCDM metodų taikymo galimybes uždaviniams statybos srityje spręsti, apžvalga. Išnagrinėtos vyraujančios tendencijos Lietuvoje, remiantis kaimo turizmo sodybų analize. Skyriaus pabaigoje formuluojamos išvados ir tikslinami disertacijos uždaviniai.

Antrajame skyriuje išskiriamos keturios galimos etninės architektūros vystymo(-si) kryptys ir atliekama jų SSGG (SWOT) analizė. Pateikiamas kompleksinis modelis bei bazinė rodiklių sistema pastatų vystymo(-si) sprendimams aprašyti bei vertinti, taikant MCDM metodus.

Trečiajame skyriuje sprendžiami du uždaviniai, taikant pasiūlytąjį modelį, kompromisiniams sprendimams rasti: pirmajame nagrinėjamos su natūraliu apšvietimu susijusios problemos bei jų sprendimo galimybės; antrajame – vertinama pastato visuma ir jos pokyčiui įtaką darantys veiksniai bei ieškoma racionalaus pastato atnaujinimo sprendimo. Pateikti pasiūlymai LR Paveldo tvarkybos reglamento sukūrimui.

Bendrosios išvados

1. Atlikus literatūros analizę prieita išvada, kad rekonstruojant ir pritaikant etninės architektūros pastatus šiuolaikiniams reikalavimams ar statant naujus su etninės architektūros tęstinumu susijusius pastatus, nėra pakankamai rekomendacijų, kuriuos senųjų pastatų bruožus reikia išsaugoti, o kuriuos galima keisti.
2. Atlikus su etninės architektūros tęstinumu susijusių pastatų analizę ir išanalizavus LR galiojančius teisės aktus, apibrėžiančius reikalavimus etninei ir neetninei architektūrai, nustatyta, kad šios architektūros vystymas(-is) Lietuvoje yra nepakankamai reglamentuojamas ir vyksta neplaningai. Nustatytas poreikis atlikti mokslinius tyrimus ir parengti etninės architektūros pastatų vertinimo ir tvarkybos rekomendacijas.
3. Atlikus tyrimus, susijusius su daugiatikslių sprendimų priėmimo metodų taikymo galimybėmis statybos uždaviniams spręsti, nustatyta, kad daugiatikslė sprendimų priėmimo teorija gali būti efektyviai taikoma ir sprendžiant etninės architektūros vystymo(-si) problemas bei ieškant kompromisinio sprendimo tarp tradicijų išlaikymo ir šiandieninių poreikių tenkinimo.
4. Nustatytos keturios galimos etninės architektūros vystymo(-si) kryptys: konservatyvioji, novatoriškoji, konservatyvioji + novatoriškoji, alternatyvioji. Atlikus SSGG (SWOT) analizę, sudėtinga vienareikšmiškai nustatyti, kuri kryptis yra pranašesnė prieš kitas dėl poreikio vertinti kryptis pagal skirtingus aspektus. Šiuo tikslu siūloma SSGG metodą taikyti kartu su MCDM metodais.
5. Sudarytas kompleksinis modelis, pagrįstas daugiatikslių sprendimų priėmimo teorija, kurį taikant etninės architektūros pastatų vystymui(-si) aprašyti ir vertinti, galima suformuoti probleminių situacijų sprendimo būdus ir rasti racionalius pastatų rekonstrukcijos bei statybos sprendimus.
6. Sudaryta bazinė rodiklių sistema, apimanti architektūrinio paveldo saugojimo, šiandieninių statybos normų tenkinimo, energijos taupymo, kokybiškos gyvenamosios aplinkos kūrimo aspektus, sudaro galimybes ieškoti pastatų plėtros kompromisinių sprendimų, taikant daugiatikslių sprendimų priėmimo metodus.
7. Rengiant kompromisinius sprendimus, sprendimo priėmime dalyvaujančių suinteresuotų grupių interesų suderinamumą įvertinus matematiniais metodais, nustatyta, kad nors pastebimi tam tikri nuomonių skirtumai, tačiau nuomonių suderinamumo rodiklis pakankamas (suderinamumo koeficientas *CR* neviršija 10 proc.), kad būtų galima priimti objektyvius sprendimus.

8. Parengtą kompleksinį modelį pritaikius sprendžiant etninės architektūros gyvenamųjų pastatų natūralaus apšvietimo gerinimo, pastatų energinių savybių gerinimo ir fasadų tradicinių bruožų išsaugojimo klausimus, randami racionalūs sprendiniai, užtikrinantys inžinerinių ir architektūrinių aspektų dermę.
9. Pasiūlytos rekomendacijos LR paveldo tvarkybos reglamentui sukurti ir pasiūlytos rekomendacijos, siekiant pagerinti senosios etninės architektūros pastatų būklę, tenkinant šiandieninius poreikius ir išsaugant senuosius tradicinius pastato bruožus. Modernūs pastatų atnaujinimo sprendimai ir naudojamos medžiagos turi atitikti autentiškumo reikalavimus užtikrinant darbų kokybę. Jei, atliekant etninės architektūros pastatų atnaujinimo ir tvarkybos darbus, dėl pagrįstų techninių ar estetinių priežasčių tam tikrų norminių dokumentų reikalavimų visiškai tenkinti neįmanoma, turi būti siekiama maksimaliai atitikti reglamentuojančias minimalias normas. Kompromisiniams sprendimams priimti siūloma taikyti disertacijoje pateiktą kompleksinį modelį.

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CONSISTENCY BETWEEN CONTEMPORARY BUILDING NORMS AND TRADITION IN VERNACULAR BUILDINGS

Summary of Doctoral Dissertation
Technological Sciences, Civil Engineering (02T)

Eglė Šiožinytė

ŠIANDIENINIŲ STATYBOS NORMŲ IR TRADICIJOS DERINIMAS ETNINĖS ARCHITEKTŪROS PASTATUOSE

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