Ekoloji 28(108): 1089-1094 (2019)

LETTER TO THE EDITOR

Improvement of Art Style of Ecological Architectural Design in Alpine Region

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For many years, the research on engineering construction in alpine regions has been carried out very early in the world, but the research on the impact of engineering construction projects on regional ecological environment is relatively lagging behind. From the perspective of the impact of ecological environment factors, relevant research focuses on the impact of construction projects on permafrost and vegetation, wetland, land desertification, wildlife and nature reserves in alpine regions for many years. In the study of the methods of ecological environment impact prediction and evaluation, the related research focuses on the prediction and evaluation of the impact of soil erosion in permafrost and alpine regions for many years. From the existing research results, the research on the ecological environment impact of engineering construction in alpine regions should be systematized, quantified and comprehensive. Specific work includes the establishment of evaluation index system of ecological environment impact and the formulation of comprehensive evaluation method of ecological environment impact.

Alpine Region; Ecological architecture; Style of Art

1 INTRODUCTION

Engineering construction projects mainly include linear engineering, water conservancy engineering and building construction engineering, and the related research objects are focused on linear engineering. This phenomenon is consistent with the actual situation: there are few people in alpine areas, and engineering construction projects mainly focus on linear engineering such as road construction and pipeline laying. From the perspective of modern science and technology level and protection of human living conditions in the 21st century, environmental protection in alpine areas should be a main line throughout the whole construction process. The understanding of environmental problems in modern civilization has been improved from the single intuitive external factor (water, atmosphere, sound environment) to the non-intuitive internal factor (including water, atmosphere, sound environment), which constitutes the comprehensive environment of human living environment. Based on the above concepts and understandings, consistently implementing the leading idea of environmental protection is a solid foundation for engineering construction to become an eco-environmental protection project (Gokarakonda, Kumar 2016).

Zhang (2019) published an article in the Issue 107 of Ekoloji, entitled “Relationship between Regional Economic Development and Ecological Environment Based on Spatial Data Mining”. This paper uses spatial data mining method and spatial analysis software to analyze the spatial distribution of GDP in Heilongjiang industrial corridor in 2018. In addition, the spatial correlation of GDP level is also analyzed. The results show that the spatial correlation of GDP of each county in this period is positive, and the correlation coefficient is small. The

spatial distribution of GDP shows spatial clustering among similar values.The spatial distribution of GDP is positively correlated with the ecological environment factors, which indicates that the economic development activities of industrial corridors have a greater impact on the ecological environment. Through the correlation analysis of GDP and population in Harbin counties, it is found that the spatial impact of GDP on population is also positively correlated. The relationship between GDP of Harbin County and the number of senior high school graduates is further analyzed. The results showed that there was a negative correlation between them. This paper has obtained good research results in this field. On this basis, this paper improves the artistic style of ecological architectural design in the cold environment.

2 IDEA DESCRIPTION

2.1 Current Situation of Environmental and Ecological Environment in Alpine Region

In alpine region, the climate is harsh, the soil is poor, the vegetation is scarce, the wildlife resources are abundant, the species are more and the population is large. Most of the rare and endangered wildlife on both sides of the line are mammals, and some of the birds are protected by the state. The division and establishment of nature reserves at all levels, such as Hoh Xili National Nature Reserve and Sanjiangyuan National Nature Reserve, have enabled the unique ecological environment of the plateau to be specially managed according to law.In order to effectively protect the natural environment and animal and plant resources in the area, and to improve the effectiveness of management in the light of human production activities and construction requirements, the construction department divides the nature reserves into core areas, buffer areas and experimental areas (Bálint et al. 2016).

2.2 Impact of Engineering Construction on Ecological Environment in Alpine Region

With the vigorous development of engineering construction and the rise of regional development, the ecological environment in the permafrost areas has also begun to deteriorate, which is manifested in the large-scale degradation of permafrost, the impact on the original landscape and animals, the shrinkage of alpine wetlands, the degradation of vegetation, the aggravation of pollution and soil erosion.These problems have attracted the attention of some scholars. Borwn put forward for the first time a network of environmental protection problems in permafrost regions for many years by analyzing the changes of permafrost state under artificial disturbance. Engineering activities can directly affect the various elements of the ecological environment. More importantly, there are complex relationships among the elements. Changing one of the elements of the ecological environment will also have irreversible effects on other elements.

2.2.1 Study on the effects of engineering activities on Vegetation in alpine regions for many years

Because of the fragility of the regional ecosystem, it is difficult to restore the vegetation once it has been destroyed in the alpine region for many years. Scholars at home and abroad attach great importance to the study of the effects of engineering activities on Vegetation in alpine regions for many years. VTutubialan used satellite remote sensing images to study the effects of air pollutants (S02 and metal particulate matter) and thermal pollution on Vegetation in years of high and cold regions during the smelting of Niorl'Sk nickel ore in northern Siberia.It is concluded that the vegetation in this area has been in a state of continuous degradation from 1961 to 1949.Webber discussed the sensitivity, restoration and conservation of vegetation under human activities such as oil exploitation, excavation and filling in the Arctic.It is concluded that the sustainable development of ecological environment in alpine regions for many years must protect its biodiversity (Li et al., 2016, Lam et al., 2018, Liew et al., 2019).

2.2.2 Study on the Impact of Engineering Activities on Wetland Ecosystem in Alpine Region for Many Years

In demonstrating the ecological environmental impact of construction projects in alpine regions for many years,

many literatures are concerned with the analysis of the impact on alpine wetlands.For example, in the environmental impact assessment of several large-scale reconstruction projects of Qinghai-Tibet Highway, the mechanism of wetland degradation caused by highway construction is studied. The impervious layer, flat terrain and poor permeability formed by permafrost for many years are the fundamental reasons for the formation of cold wetlands. In the process of highway construction and operation, the degradation of permafrost caused by vegetation destruction, the change of surface properties and the change of surface hydrology caused by subgrade bridge and culvert projects will accelerate the degradation of alpine wetland ecosystem.

2.2.3 Study on the Impact of Engineering Construction on Land Desertification in Alpine Regions for Many Years

In the past, the study of land desertification in alpine areas mainly focused on the role of natural factors, because there are good climatic conditions, permafrost conditions and material conditions of desertification in alpine areas for many years. In recent years, with the intensification of human activities in plateau and alpine areas, human factors have been gradually incorporated into the research scope of desertification in alpine areas, such as oil pipelines in permafrost zone, highway construction, desertification caused by overloading pasture. There are also many documents on the environmental benefits of desertification on the plateau (Neveu, 2016).

2.2.4 Study on the Impact of Engineering Construction on Nature Reserve in Alpine Region for Many Years

If highways and railways cross nature reserves in alpine regions for many years, they will inevitably have an impact on them. For example, both the Qinghai-Tibet Highway and the Qinghai-Tibet Railway pass through the Kekexili Nature Reserve and the Sanjiangyuan Nature Reserve to a certain extent. In order to minimize the impact of engineering construction on nature reserves and wildlife, China has carried out many studies in this regard, especially in the special report on the ecological environment impact of the newly built railway Qinghai-Tibet Line, the impact of the line crossing nature reserves and mitigation measures have been described in detail. In view of the actual situation of the construction of the Qinghai-Tibet Railway, a certain range of buffer zones are delimited along both sides of the railway line in the two nature reserves, and their functions are changed from buffer zones to experimental zones. In route selection, as far as possible, the sensitive zones (such as wetlands, source water sources, etc.) with both water conservation functions and biodiversity conservation and Plateau ecosystem integrity should be avoided.In the design, attention should be paid to the establishment of animal corridors along the line, leaving enough animal migration corridors and communication channels between populations to meet their habitat, migration and reproduction needs, and avoiding the impact of the line on the cutting and encroachment of nature reserves. The line should pass through the wetland as little as possible, and pay attention to the protection of the frozen soil environment.It is necessary to avoid cutting surface water and changing the flow direction of groundwater in the sections crossing wetlands in order to ensure the connectivity of wetlands. In the high temperature permafrost zone and wetland area, the bridge is chosen as the alternative.The principle of mitigating the impact of these nature reserves is reflected in the selection of ecological environment protection schemes for local sections of the Qinghai-Tibet Railway, such as the non-freezing spring to Yanshiping scheme, the non-freezing spring to Qingshuihe scheme and so on.

3 Improvement of Environmental Art Style of Engineering Ecology Construction in Alpine Region

To study the impact of engineering construction on the ecological environment in cold regions is to analyze the improvement strategies of the artistic style of ecological architecture. According to the ecological environment impact assessment of engineering construction in the alpine region for many years, the research should include the following aspects.

3.1 Prediction and Assessment of Geological Environmental Impact of Engineering Activities on Frozen Soil

Prediction and evaluation of soil erosion, vegetation destruction, wildlife impacts, ecological impacts of atmosphere, water and noise, cumulative ecological impacts and strategic ecological impacts are studied. According to the research literature, the related research mainly focuses on the prediction and evaluation of permafrost layer and soil erosion in the alpine region for many years, as follows. According to the investigation data of permafrost environment of Qinghai-Tibet Highway and civil buildings along it, the influence of construction activities on permafrost geological environment is mainly manifested in the following two aspects: land use and earthwork engineering.By changing the environment and conditions of vegetation and local micro-geomorphology, the seasonal melting depth and ground temperature of permafrost are affected. Land use and earthwork projects directly change surface and groundwater runoff conditions in Permafrost Regions (Hong, 2016).

3.2 Prediction and Evaluation of Soil and Water Loss in Alpine Regions for Many Years

3.2.1 Wind erosion

Wind erosion mainly occurs in relatively gentle geomorphic units. The evaluation of wind erosion is mainly based on the research results of wind erosion at home and abroad, and the classification index is formulated, as shown in Table 1.

Table 1 Classification of wind erosion intensity

Level	Micro degree	Light	Moderate	Strength	Extreme intensity	Disastrous
Erosion modulus	＜80	80~800	800~2400	2400~8000	8000~28000	＞28000

Many factors affecting wind erosion intensity need to be determined, and many parameters need to be selected according to the local actual situation in the actual evaluation.According to the data of simulation experiments or field measurements, the relevant parameters are determined as auxiliary indicators for evaluation.There are five main vegetation types in alpine areas for many years, namely desert, bare Gobi, Valley shrub, alpine meadow and alpine grassland. In alpine meadow and alpine grassland, the main controlling factor of wind erosion is vegetation. According to the simulation results, Dong Zhibao et al. think that wind erosion decreases exponentially with the increase of vegetation coverage. So $E = 26220.24EXP(-11.88C)$ .In formula, E is erosion modulus, C is vegetation coverage.The auxiliary level indicators are shown in Table 2.

Table 2 Classification of Auxiliary Indicators of Wind Erosion Intensity

Level	Micro degree	Light	Moderate	Strength	Extreme intensity
vegetation coverage /%	＜60	60~30	30~20	20~10	＜10

3.2.2 Freeze-thaw erosion

At present, there is a lack of quantitative research at home and abroad. Generally, the relative strength of freeze-thaw erosion is qualitatively evaluated according to the temperature and the moisture content of surface

materials. The temperature in the alpine areas for many years depends on the altitude.In the prediction of freeze-thaw erosion caused by engineering construction in alpine areas for many years, qualitative classification is carried out mainly according to altitude and referring to surface water content.Because freeze-thaw erosion is a slow creeping process, the construction period of engineering construction in alpine areas for many years can not be the focus of evaluation. The classification index of freeze-thaw erosion intensity determined by altitude is shown in Table 3.

Table 3 Classification of freeze-thaw erosion intensity

Level	Micro degree	Light	Moderate	Strength	Extreme intensity	Severe
Altitude /m	＜3600	3600~400	4000~4500	4500~5000	5000~8000	＞8000

According to the forecasting assistant index and model, taking vegetation type as a large unit and engineering type as a small unit, the impact of engineering construction projects on local soil erosion can be forecasted for many years in alpine regions.

4 Conclusion

Over the years, the research on public participation, late monitoring and management measures, vegetation restoration and cumulative impact assessment of ecological environment of construction projects in alpine regions is very immature, and these are all indispensable links to improve the assessment procedure of ecological environment impact.Therefore, systematic, quantitative and comprehensive prediction and evaluation is the work that needs to be concentrated in the field of ecological environment impact and evaluation of engineering construction projects in alpine regions for many years in the future, and a large number of existing research results at home and abroad are the strong scientific basis for further research.

References

Bálint M, Márton O, Schatz M, et al. (2018) Proper experimental design requires randomization/balancing of molecular ecology experiments. Ecology & Evolution 8(3):1786-1793.

Gokarakonda S, Kumar A (2016) Passive Architectural Design Index applied to vernacular and passive buildings. International Journal of Environmental Studies 1-10.

Hong TX (2018) Landscape Design of Colleges and Universities Based on Low Impact Concept: A Case Study of the Shared Training Base from Jiangsu Vocational Institute of Architectural Technology. Journal of Landscape Research 10(04):24-27.

Lam SS, Liew RK, Cheng CK et al. (2018) Pyrolysis production of fruit peel biochar for potential use in treatment of palm oil mill effluent. Journal of Environmental Management 213: 400-408.

Li R, Lin H, Niu H, et al (2017) Effects of irrigation on the ecological services in an intensive agricultural region in China: a trade-off perspective. Journal of Cleaner Production 156: 41-49.

Liew RK, Chai C, Yek PNY et al. (2019) Innovative production of highly porous carbon for industrial effluent remediation via microwave vacuum pyrolysis plus sodium-potassium hydroxide mixture activation. Journal of Cleaner Production 208: 1436-1445.

Neveu MJ (2017) The Design of Environmental Design. Journal of Architectural Education 71(2): 135-135.

Zhang Z (2019) Relationship between Regional Economic Development and Ecological Environment Based on Spatial Data Mining. Ekoloji 28(UNSP e107187107): 1617-1625.