Study the Influence on the Value Loss of the Environment in Phyllite Areas Highway Construction

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Abstract. In order to analyze the impact of highway construction project on the environment, the environmental impact assessment index of highway construction project was selected according to the principle of objectivity, science and integrity. In this paper, the evaluation index system was established based on the subgrade project in the eastern section of Ankang section from Shiyan to Tianshui's expressway. The evaluation of value loss was conducted from the ecological environment, air and water environment and acoustic environment respectively. The results showed that the project had a great impact on the society, especially the surrounding soil and human health.

INTRODUCTION

Highway construction project construction is wide, large, long construction period, involving many factors. The estimation of environmental loss is of great significance to the promotion of sustainable social development. Based on the soft rock filling in the eastern section of the Ankang section of the Shitian high-speed project, the environmental loss is estimated and analyzed. The project utilizes a large amount of soft rock such as phyllite and mud slate distributed along the line, after treatment, it is used for roadbed filling. The method not only solves the problem of lack of embankment filler, but also saves investment, protects local environment and produces huge economic and social benefits. In view of this, it is very important to carry out technical and economic analysis of soft rock roadbed improvement.

EVALUATION SYSTEM

Section Headings.

The environmental impact of highway construction project is a complex system with many factors. The selection of index system should not only follow the general principles of objectivity, science, integrity and effectiveness, but also meet the requirements of hierarchical, operability and other principles. [1.2]

TABLE1. Highway Construction Projects Environmental Assessment Indicators

First level indicator	Secondary indicators	Metric attribute
Natural environment	Soil loss	Quantitative
	Vegetation loss	Quantitative
	Animal loss	Quantitative
	Crop losses	Quantitative
social environment	Socio - economic situation	Qualitative
	Resettlement	Quantitative
	Public participation	Quantitative
Sound environment	Noise pollution	Qualitative
Water Environment	The impact of water	Qualitative
Atmospheric Environment	Fixed CO_2 losses	Quantitative

ESTIMATION OF ECOLOGICAL ENVIRONMENT BY FILLING SOFT SUBGRADE WITH CEMENT

Loss of Soil Value C_t

In general, the value loss of soil erosion without vegetation is C_{ty} , and the economic loss C_{tq} of soil fertility loss is substituted for the loss of soil value. According to the existing standards, organic fertilizer take 2,000 Yuan per ton, inorganic fertilizer take 2,400 Yuan per ton. Using the other local engineering examples of the statistics, take 60cm thick soil, organic fertilizer and inorganic fertilizer content were 2400kg / ha, 4700kg / ha.

(1) Loss of economic value of soil nutrient loss C_{ty}

$$C_{ty} = \sum A * (Q_1 L_1 + Q_2 L_2) * \frac{1 - (1 + R)^{-n}}{R} \approx 7750.37(\text{million}) \quad (1)$$

A----The total area of vegetation destruction along the land; Q_1 ----The nutrient content of soil in unit area; Q_2 ---Soil organic matter content per unit are; L_1 ---Shadow prices of inorganic fertilizers; L_2 ---Shadow prices of organic fertilizers.

(2) Loss of Economic Value of Soil Erosion; Q select 15.

$$C_{tq} = \sum q * A / H * L_3 * (1 + r) * \frac{1 - (1 + r)^n (1 + R)^{-n}}{R - r} \approx 2765.92(\text{million}) \quad (2)$$

$$C_t = C_{ty} + C_{tq} \approx 10516.29(\text{million})$$

LOSS OF ECONOMIC VALUE OF WATER CONSERVATION CW

Loss of water conservation value of vegetation can be calculated using the construction cost of the reservoir as an alternative, the average runoff coefficient in this area is 0.68, the annual average precipitation is 1000mm, the storage capacity per unit storage capacity is 0.67, and the highway construction area is 645.52 hectares. Calculated as follows:

$$C_w = R_T * D * \frac{1 - (1 + R)^{-n}}{R} \approx 2195.94(\text{million}) \quad (3)$$

R_T ---Total annual runoff; C ---Storage capacity per unit of storage capacity, select 0.67; R ---Unit annual runoff; Q ---Local average annual precipitation; a ---Runoff coefficient

Purification of Atmospheric Value Losses C_q

$$C_q = \sum A_i * Q_2 * L_5 * \frac{1 - (1 + R)^{-n}}{R} \approx 1461.59(\text{million}) \quad (4)$$

Q_2 ---The amount of CO_2 absorbed by vegetation per unit area;

L_5 ---The cost of CO_2 reduction per unit weight

Fixed CO_2 loss of value C_g

According to the relevant provisions of China, fixed 1 ton of pure C cost about 250 yuan. This paper uses the shadow price method to estimate the fixed value.

$$C_g = 1.63 * 250 * 12 / 44 T_2 * (1+r) * \frac{1 - (1+r)^n (1+R)^{-n}}{R-r} \approx 1536.97(\text{million}) \quad (5)$$

T_2 -----Vegetation Calculate the growth of the year;

The Loss of Human Health C_k

TABLE 2 Standard Data Sheet

disease	P	Y_i (Yuan)	H_i (Yuan)	T_i (Yuan)	W_i (Yuan)	L_i (Yuan)	L_{oi} (Yuan)
Chronic bronchitis	3000	5193	0.065	1	11	4.20	2.18
Intestinal inflammation	3000	2462	0.054	1.2	11	4.24	2.01

$$C_k = [P * \sum T_i L_i + \sum Y_i L_i + P * \sum H_i L_i + P * \sum W_i L_{oi}] * M * \frac{1 - (1+R)^{-n}}{R} \approx 2353.83(\text{million}) \quad (6)$$

P ---Human Resource Value; M ---Number of contaminated areas along the highway; T_i ---The length of time a patient suffers from a disease; Y_i ---The cost of treatment of a disease patient; H_i ---The time of missed work of the patient accompanying a certain disease; W_i ---Loss of a disease caused by death; L_i ---Pollution incidence; L_{oi} ---Pollution mortality rate.

Additional Cleaning Charge Caused by C_x

According to the statistics, the cleaning time in the vicinity of the road along the road than in the vicinity of the road area for more than 4 days per year, so taking increased cleaning time as $T=4$ days, the rate of local labor force as 30%, and the average of shadow wage reference as 50 Yuan per day.

Household cleaning costs due to pollution caused by multi-expenditure C_x

$$C_x = P * \frac{1 - (1+R)^{-n}}{R} (I * G * T_i + C * T_2) \approx 983.79(\text{million}) \quad (7)$$

P --- Total population of polluted area; I ---Labor population in polluted area;

T_i ---Increased additional cleaning time; G ---The average shadow wage in the region.

Estimation of Acoustic Environment Loss C_{sz}

(1)Through the interview data obtained from the analysis can be used to establish a linear regression equation, the following formula:

$$Y = a + bX \quad (8)$$

Y ---Residents in order to avoid road noise to pay desire;

X ---Per capita income of residents

(2)Residents of the polluted area can avoid the cumulative payment of road noise. The value of the survey will often be greater than the actual payment value [4], so the loss of the sound environment is estimated to be multiplied by a factor of C sound, the general take 0.7.

$$C_{sz} = 0.7 * \sum 12 * Y_n * N * h \approx 1503.35(\text{million}) \quad (9)$$

FIGURE1. The amount of loss assessment of the indicators

From Figure 1, it can be seen that the cement-modified soft rock roadbed has a great influence on the soil. Second, from the table we can see the impact of highway construction is also relatively large on human health. Therefore, in the construction, we must pay attention to the coordination of the road and the surrounding environment.

RECOMMENDED ENVIRONMENTAL MEASURES

(1) Reducing the impact on the landscape environment

When we are on this road in the road construction, we should try not to set the soil or soil in the vicinity of the road; If you need to set up, after the completion of the construction, we should do landscape processing at first, restore the vegetation, and we should choose local vegetation for afforestation;

(2) Prevention and Control of Geological Hazards

We can set the drainage channel and diversion embankment to discharge surface water and trunk groundwater; we can build the retaining wall to increase the anti-skid, to prevent the soil from falling; If we want to increase the shear strength, we should take masonry slope or green slope, and other measures to prevent the collapse of dam.

(3) Measures for Prevention and Control of Noise in Residential Buildings along

We can plant noise reduction along the road; Although during the construction period, noise reduction forest can't play a role fully, but in the long run, combining with the road along the greening and landscaping construction, which is economically viable to choose high fast and lush tree species, in the residential and highway planting a certain noise reduction between the forest.

CONCLUSION

In this paper, a simple analysis and evaluation of soil, water source, air and sound source are carried out. The quantitative calculation formula of monetization in environmental value loss is established, and the results show that the impact of the environment is large, and finally we put forward measures to mitigate the impact of environment.

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