

Full Length Research Paper

Visual assessment for the evaluation of Erzurum-Bayburt-Of highway as scenic road

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A visual assessment study was conducted to evaluate the possibility of the use of E- 97 route in Erzurum-Bayburt-Of (Trabzon) D925 state highway as scenic road. Highway of Erzurum-Bayburt-Of, which is 231 km, is a short cut from Eastern Anatolia to the Black Sea Region of Turkey. This route offers passes through three distinct natural and cultural zones as it passes through the cities of Erzurum, Trabzon and Bayburt. These represent the regions of Eastern Anatolia, the Black Sea and the transitional zone between the two regions, respectively. The rivers of Karasu and Coruh, the mountains of Kop and Soganli, and Uzungol Nature Park, are included in the study area, and contribute to the recreational potentials and increase the visual quality values. In the study, detailed maps showing all the elements, including the natural and cultural structures of the route and existent recreational values and vegetation cover were drawn. In the visual quality assessment of the route, four hundred university students from Ataturk University scored the scenes presented in a computerized format. Data were analysed using frequency distribution analysis, t- test and Anova test. According to the results, there were significant statistical differences between the parts of the route in the respect of visual quality. The segment between Soganli Mount Passage and Of (SO) received the highest mean score with 4.18 point while the segment between Erzurum and Bayburt (EB) got the second and the Bayburt and Sogali Mount passage (BS) received the third highest scores with 3.55 and 3.49, respectively. For the visual quality characteristics of scenic beauty, excitement, attractiveness, water effect, colour effect, natural vegetation, road scene, recreational value, pastoral view, land form, naturalness, authenticity, originality, panoramic view, confidentiality, vitality, uniqueness and harmony, SO part received the highest scores while EB segment got the highest scores for cultural values. It was consequently found that the Erzurum-Bayburt-Of highway route has highly efficient natural, cultural and visual values to be evaluated as scenic road and some suggestions were proposed.

Key words: Visual landscape analysis, visual quality, scenic road, highway, Erzurum-Bayburt-Of highway route.

INTRODUCTION

The desire for natural areas has increased due to the reasons such as the increase in world and local populations, changes in the requirements of foreign and domestic tourists and increase in the number and income levels of people, all of whom have different expectations of tourism. In this respect, it can be said that today the most rapidly growing tourism type is a nature-based one. As a result, natural areas have received more

importance from the tourism bureaus and industries. People prefer natural areas for the recreational aims to get away from the stresses of everyday life. Interests of the young and the literate in natural areas have been increasing over recent years (Demir and Cevirgen, 2006).

In the U.S.A., due to a long history of natural parks and wilderness preservation, recreational movements are often directed to the remote areas. In developed countries, generally, park ways, scenic roads and scenic corridors have been constructed in order to contribute to the natural and man made green areas (Urgenc, 2000) and to offer pleasant journeys from city to recreation destinations in the mountains and coastal areas. In

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Turkey, even in short holiday periods, people prefer resort areas in the southern part of the country. When considering the time spent on the roads, routes leading to tourism destinations should be made safer and more interesting by offering fascinating landscapes as a feature of the journey.

Roads are the areas where people are in the closest relationship with green sites in urban areas. A road can separate or tie green and structural areas; prevent horizontal and vertical ugly views, connect rural and urban areas and increase the relation between human and nature. With the functions such as direction of people to some important points, stress on some elements, confinement of the drivers' interests, shading effect on paused traffic, providing security for pedestrians, green areas can contribute to traffic techniques (Aslanboga, 1986).

According to Linehan and Gross (1998), among the elements of landscape quality are land form, biological and ecological structures, beliefs and historical, cultural and social structures. According to Gobster (1999), a landscape with higher visual quality has also superior characteristics for recreational value, retentiveness, ecological features and naturalness. Form, line, colour, vitality, harmony and uniqueness are the important factors in the determination of the visual characteristics of a landscape.

Scenic evaluation elements include landscape characteristics, land form, vegetation, water structures, cultural features and scenic harmony. Scenic harmony and landscape characteristics are two important elements of scenic assessment. Landscape character is a description of the landscape features, the whole view of small and large geographical areas. Landscape character can also be defined as the evaluation of an ecosystem. A landscape can inhabit both biophysical elements (land forms, water, vegetation) and cultural elements (historical buildings, cultivation areas, wind breakers, canals and others; Galliano and Loeffler, 2000).

Highways are probably the most effective civil engineering structures among the attempts of humans to adjust the world to their use and life. Highways constituting an international network, are not only planning elements which divide landscapes they pass through, but also are elements that can be compatible to these landscapes. With the changing conditions of urban life, increase in the ownership of motor vehicles and progress in the road construction techniques, the last sixty years in Turkey have seen an historic increase in the mobility of people (Ozturk, 2002).

Roads are among the most effective landscape elements which can construct relationship between human human beings and nature. People can see and recognise natural values only in the areas where they can access. However, highways are among the manmade structures which have the largest unfavourable effects on highways (Bilican, 1995).

In the assessment of highway landscape

characteristics, consideration is given to: geographical, cultural, natural features of the routes, vegetation, historical values, land use, socio-economic structure, provision of interesting and comfortable driving for passengers, presence of fascinating landmarks, visibility range, tissue, hiding the bad views, presence of the potentials for tourism and recreation, traffic security, presence of visual variety (which can break monotony), harmony of highways with land topography and scene, standards of roads and legal limitations (Anonymous 1986; Emektas, 1987; Ozgunc, 1999).

In the present study, Erzurum-Bayburt-Of highway route was evaluated in order to suggest the use of minor roads which have natural and cultural diversity and scenic beauty, and provide accessibility to the same destinations as the main, heavily trafficked roads. The route in the study is a short cut used instead of Erzurum-Bayburt-Gumushane-Trabzon-Of highway from Erzurum to the district of Of, governed by the city of Trabzon. This route, which was evaluated in the respect of visual quality, is not known by many people, has considerably more beautiful scenery than the main road, and can be suggested for the people who enjoy adventure. In the scope of the study, it is shown that this road has certain characteristics for a scenic road and could be designated as a scenic route (Sezen, 2009).

MATERIALS AND METHODS

E-97 road of Erzurum-Bayburt-Of (Trabzon) D925 state highway was chosen to be the study area. This route passes through the settlements of Erzurum, Ilica, Askale, Maden, Bayburt, Caykara, Dernekpazarı and Of. This road leading from Erzurum through Bayburt to Of is 231 km. This distance can increase up to 242 km when 11 km Uzungol corridor is added to the route. The route is presented in Figure 1. Images from the route are presented in Figure 2.

In the study, natural and cultural source values of the route and existent recreation values were determined and related literature was obtained. After the creation of the visual landscape quality assessment method and the selection of sample photos among the images taken from the area, the visual landscape quality tool was administered and assessment was performed from which suggestions were proposed. In the study, "visual quality assessment" method originally used by Daniel (2001) and Arriaza et al. (2004) was employed.

The route was surveyed in the spring, summer and autumn seasons of 2006 and 2007. The route was divided into categories considering the characteristics and vegetation and colour changes in autumn were monitored by taking images. After that, the images were arranged into an instrument for visual quality assessment using a visual quality questionnaire. Four hundred students from various Faculties and Departments of Ataturk University participated in the assessment.

Over one thousand photographic views of the area were taken from only the road itself. In total, six criteria were selected for the area among the characteristics determined to be suitable for the area: water features and effects, natural vegetation, road scene, rural landscape, authenticity, land form. For instance, an image representing the overall colour effect from each corridor was

¹This study was derived from the PhD.

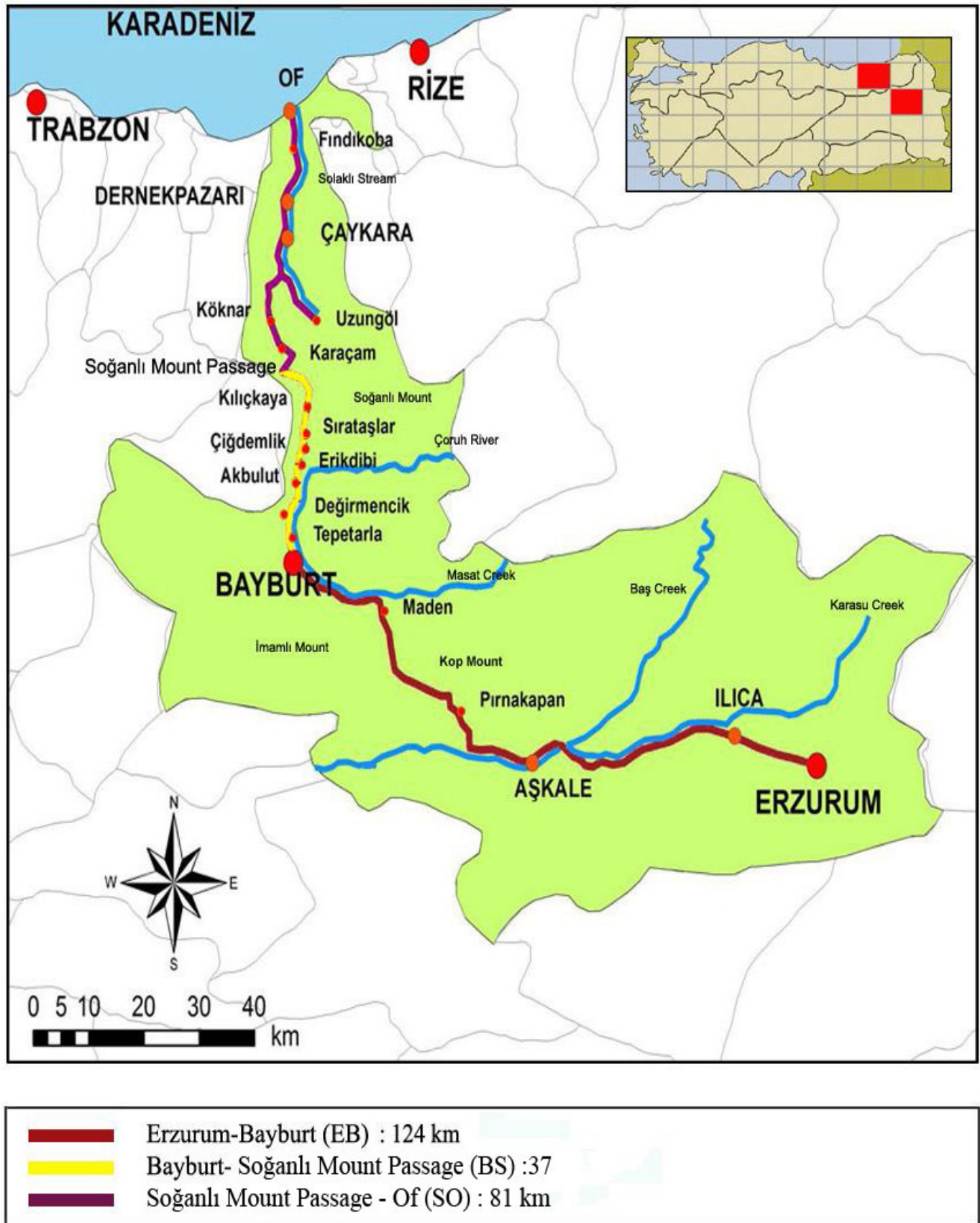


Figure 1. Study route Erzurum-Bayburt-Of highway.



Figure 2. Images from Erzurum-Bayburt (EB), Bayburt-Soganli Mount Passage (BS), Soganli Mount Passage-Of (SO) corridor.

Table 1. Visual quality assessment form 1.

Assessment criteria	Corridors		
	Score range (1, 2, 3, 4, 5)		
	Erzurum-Bayburt (EB)	Bayburt-Soganli (BS)	Soganli-O (SO)
Water effect			
Natural vegetation			
Road scene			
Rural landscape			
Land form			
Authentic settlements			

Table 2. Visual quality assessment form 2.

Assessment criteria	Corridors		
	Score range (1,2,3,4,5)		
	EB1.....EB12	BS1.....BS12	SO1.....SO12
Naturalness			
Scenic beauty			
Vitality			
Excitement			
Recreational potentials			
Colour effect			
Panoramic view			
Cultural value			
Confidence			
Originality			
Harmony			
Characteristics	Corridors		
	Erzurum-Bayburt	Bayburt-Soganli M.P	Soganli M.P-Of

selected and scored and compared. Great care was taken for the selected images to represent the area the most typically, rather than offering extraordinary moments. In the determination of the criteria for the visual quality assessment and scoring method, literature from the world and Turkey was considered (Daniel, 2008).

Images were prepared in digital environment and presented to the participating students. In the first presentation to the students, images selected from EB, BS and SO corridors were categorised according to water effect, natural vegetation, road scene, rural landscape, land form, authenticity characteristics (Table 1). Participants were asked to score from 1 (minimum) to 5 (maximum) each image. No information was given to them about the locations of the images. Each image was shown in the same duration (1 min) to the students. No previous comment was made on the images. A visual quality assessment form was prepared for the participants to make a comparison between the images (Table 1).

At the second stage of the questionnaire, participants were asked to score 12 images selected from each corridor according to 11 characteristics such as naturalness, scenic beauty and vitality between the ranges of 1 to 5. Comparisons of the images were performed according to the criteria presented in Table 2 and propositions by Prof. Dr. Terry C. Daniel (Table 2). The aim of such an application was to determine effective characteristics of each corridor.

In the statistical analysis of the questionnaire data frequency distribution analysis, t and Anova tests were applied.

RESULTS

According to Table 3, which was formed according to the assessment of the natural characteristics of the study route, it was found that the richest corridor of the route when considered the diversity of natural characteristics was Soganli Mount Passage-Of corridor, whereas Bayburt - Soganli Mount Passage corridor offered the least diversity.

The corridor between Erzurum and Bayburt, which constitutes the first part of study route, has an important place due to the hot springs in the district of Ilica. There are remains of several fortresses in the district, the most important of which is Askale Fortress (Anonymous, 2004). There is a flat topography between Erzurum and Mount Kop. In the area segment of road until Askale district the agricultural landscape is dominant. Fields

Table 3. Natural diversity of Erzurum-Bayburt-Of route.

Geological structure			
Geomorphology			
Soil structure			
Hydrological properties			
Vegetation			

Rich diversity
 Moderate diversity
 Poor diversity.

left for following, divided lands plots, colours of crops in the fields, especially in autumn, may strengthen the character of authentic and pastoral landscape elements. River bank plants, especially willow trees and sea buckthorn shrubs, line the river Karasu, which divides the route between Ilica and Askale and these provide natural views.

Mount Kop is above 3000 m and suitable for horse riding and mountain walking and hiking (Anonymous, 2005). This mountain can attract attention with the rural village settlements located on its slopes. In addition, there is a ski resort serving the city of Bayburt. This mountain is also suitable for botanical tourism with its wide range of mountain and plateau species.

Caravan possibilities are present in the Kop and Coruh Valleys. In especially summer, visitors from the Black Sea coasts can come and spend their time in Coruh Valley in tents (Anonymous, 2007). Mount Kop is an area with tourism potentials offering panoramic beauties, winter tourism possibilities, particularly exploring and adventure activities (Anonymous, 2005). Plateaus on Mount Kop contribute to general tourism while the ski resort provides opportunities centre for winter tourism. Caravan tourism can open the way to eco-tourism. The River Coruh and its basin attract many foreign and domestic tourists with its natural and cultural characteristics, including river rafting. In sum, the area has important tourism potentials with its morphological structure, folkloric features, unique architecture, rich biological diversity with flora and fauna.

The city of Bayburt, with an elevated land form extending from the Coruh Valley to the north and south, is rich in natural reserves. The Northern part of this area has different climatic characteristics dominated by the Black Sea climate; therefore, flora and fauna show great diversity. The Soganli Mountains are among the significant natural reserves of the area. In Bayburt, which is rich in water reserves, the River Coruh is the most important determinant of the geography and sub-identity of the region. The valleys of the River Coruh and its branches (in the Coruh and Masat Valleys) constitute the most important tourism destinations in Bayburt, with either visual diversity or exploring and adventure activities. The Coruh Valley is an attention attracting area for exploring and adventurous people with its unique climate,

diverse flora and fauna and high flow-rate water reserves (Anonymous, 2005).

In the stretch of the Coruh River close to Bayburt city, canoe-rafting may be suitable and in the creeks of Kılıkaya-Cencul Plateau and Konursu fishing is another activity. The corridor between Bayburt and Soganli Mount Passage is represented by the features of rural village locations, agricultural landscape, authentic structure and plateau tourism. This corridor is a passage zone between Eastern Anatolia and Blacksea geographical region.

Along the corridor of Soganli Mount-Of, the mountain ecosystem is dominant. The road follows the upper limit of forest and thus features a wide panoramic view. Spruce, fir, chestnut and rhododendron plants take place in native vegetation in the Back Sea part of Mount Soganli which is typically covered with fog. Leaf colour in autumn in the vegetation is very charming. In the proximity of the village of Karacam, people perform traditional agriculture (mainly producing corn, kale and tea). Along the road leading from Mount Soganli to Karacam, gigantic rocks can be seen. This unique scene is formed by the effects of the dense fog layer gliding from the peak of the mount and water running over the rocks. The settlements of Karacam, Koknar, Uzungol, Caykara, Dernekpazarı and Of are located along the corridor of Mount Soganli Of.

The area where Uzungol is located was evaluated as the sub-corridor of the Mount Soganli Passage-Of corridor. Uzungol can offer possibilities for cycling, paragliding, canoe-rafting, skiing, mountaineering, nature walking, plateau tourism, rock climbing, grass skiing, sailing, golf and camping (Yesilyurt, 2002). Existent recreational values along the study route are presented in Figure 2.

Since the study route represents three distinctive vegetation types and cultural features depending on three different climatic characteristics, it was visually assessed dividing it into three different corridors. The first corridor represents Eastern Anatolia Region, the second corridor shows the features of a passage zone from eastern Anatolia to Black Sea Region, though it is located in Black Sea Region geographically, and the third region is located in Black Sea Region showing the characteristics of this region. Participant students were asked to score only one photo showing the characteristics of each

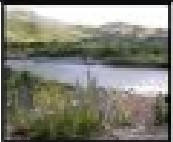


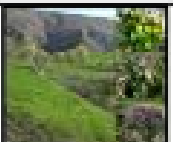
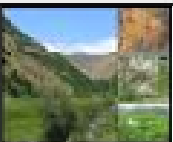
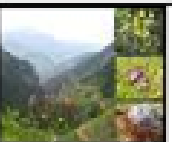












Assessment criteria	(EB)	(BS)	(SO)
Water effect			
Natural vegetation			
Road scene			
Rural view			
Land form			
Authentic settlements			

Figure 3. images taken from Erzurum-Bayburt (EB), Bayburt-Soganli Mount passage (BS), Soganli Mount Passage -Of (SO) corridor to be used in visual quality questionnaire.

corridor according to the characteristics given in Figure 3 ranging from 1 to 5 (minimum 1; maximum 5). According to the results of t – test, Erzurum-Bayburt (EB), Bayburt-Soganli Mount passage (BS), Soganli Mount passage -Of (SO) corridor were compared considering the given 6 characteristics (Figure 3).

In order to determine the differences in landscape characteristics of three corridors constituting study route, t-test was applied. Results of the test are presented in Figure 4. According to the results of the test, the highest score was given to the Soganli-Of corridor for authentic settlements while the lowest score was received by Erzurum-Bayburt corridor with rural view.

At the second stage of the questionnaire, EB, BS and SO groups were separated from each other and each group scored 12 images for 11 landscape characteristics from 1 to 5. Landscape characteristics used to score the images are given in Table 2.

Figure 2 presents the images used at the second stage of the questionnaire to make evaluation.

Scores given to the corridors of the Erzurum-Bayburt-Of highway route are presented in Figure 5.

According to the scores, for all characteristics, the Mount Soganli passage-Of corridor received the highest score. For the scores of harmony, originality, colour effect, recreation value, excitement, vitality and scenic

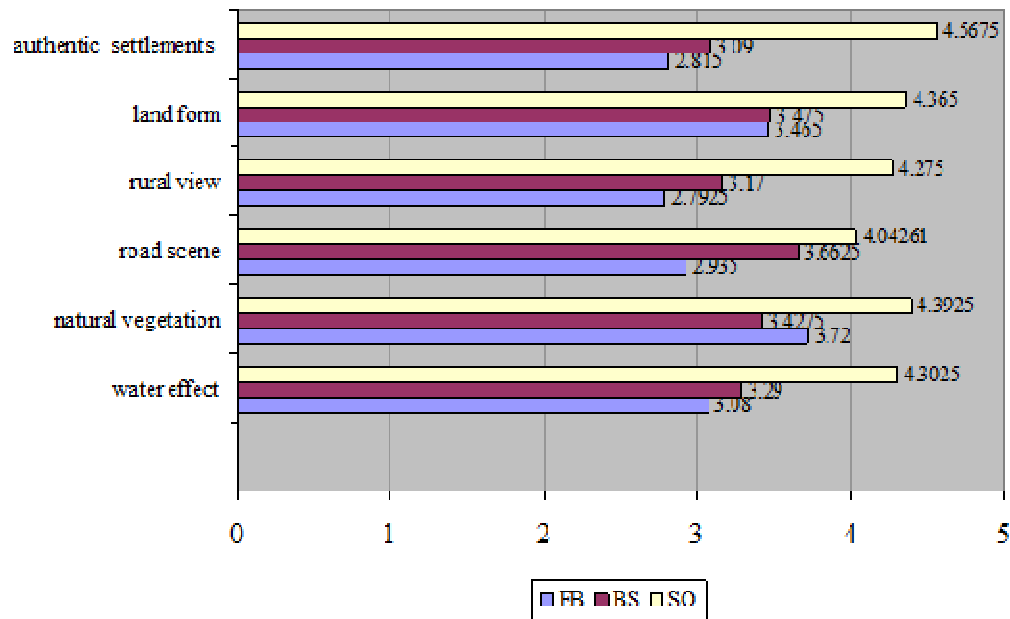


Figure 4. Comparison of mean scores given to corridors according to landscape characteristics.

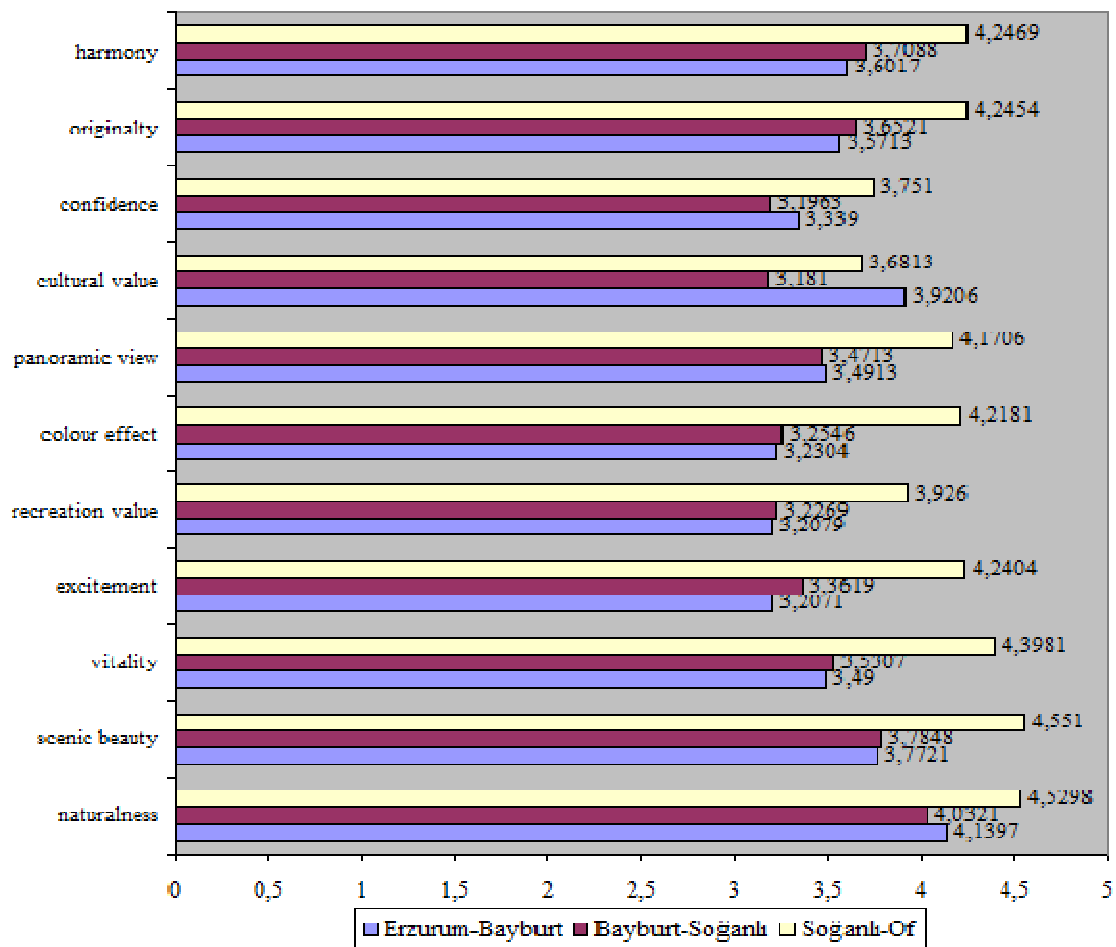


Figure 5. Comparison of the corridors in the respect of the scores given for landscape features.

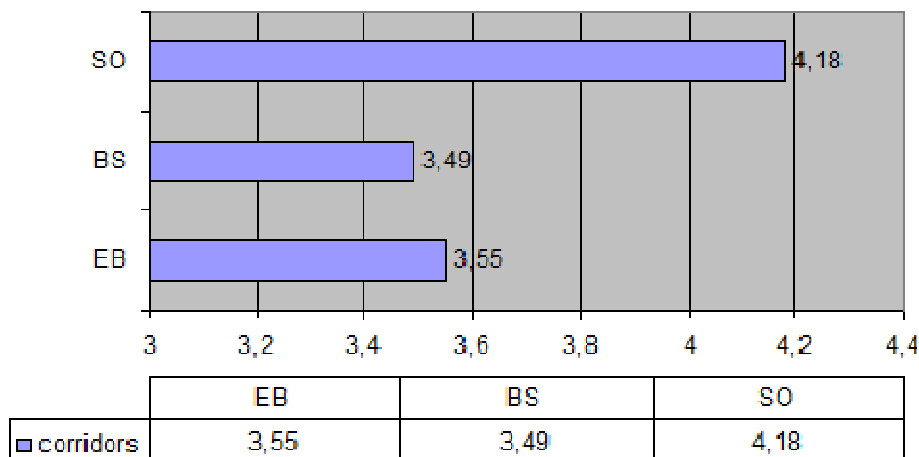


Figure 6. Comparison of the corridors in Erzurum-Bayburt-Of route in the respect of visual quality.

Table 4. Results of T test (One-Sample Test).

Corridors	Number of participants (N)	T value	Significance level	Total score	Mean score
EB	400	97.33	0.00	42.64	3.55
BS	400	87.47	0.00	41.89	3.49
SO	400	120.67	0.00	50.14	4.18

beauty, the Mount Bayburt-Soganli corridor was at the second row, while for confidence, cultural value, panoramic view and naturalness, the Erzurum – Bayburt corridor was at the second row.

When the mean of all characteristics in the Erzurum-Bayburt-Of highway route was considered, the Mount Soganli passage - Of (SO) was found to be first with the mean score of 4.18, Erzurum-Bayburt (EB) corridor at the second row with the mean score of 3.55 and Bayburt-Mount Soganli passage (BS) corridor at the third row with the mean score of 3.49 (Figure 6).

Results of t – test performed to determine the scores given to each corridor according to the results of visual quality survey are presented in Table 4.

Tables 5 and 6 present the results of Anova test carried out for the determination of the relation between gender and faculty of the participant students and their scores to visual quality assessment.

DISCUSSION AND CONCLUSION

As the consequence of the study, it can be stated that Erzurum-Bayburt-Of highway route has the values of a scenic road, overall. The natural, cultural and visual source values in the area should be publicised, and the area should be planned as scenic road. Attractiveness of the road should be increased by evaluating alternative

tourism potentials in the area and the road should be made scenic centre. For such a road to be safe, wintry conditions on the road should be managed, allowing the road be used in every season. The Erzurum-Bayburt-Of highway is not recommended for coaches and trucks, only for passenger cars prepared to drive safely. This means that people who are in a hurry to reach their destinations, who cannot see and perceive the beauties and values on the route, should take the main road. This road is recommended for those who wish to watch the scenes around the road, like adventure and want to be alone with nature, but more safely than is now the case. From the results of the visual quality questionnaire, the finest segment of the study route the last corridor, Mount Soganli Of. This corridor received the highest score in the visual assessment characteristics of authenticity, land form, rural view, road scene, natural vegetation, water effect, harmony and uniqueness, panoramic view, colour effect, recreational value, excitement, vitality, scenic beauty, naturalness. This corridor can attract much attention with its distinctive natural beauty, vegetation and topographic structure.

Culturally, the highest score was given to the first corridor, Erzurum-Bayburt. Mount Kop, located in the area, is rich in cultural values with its historical background. Presence of the Mount Kop Veterans Monument adds cultural attractiveness to the area. The whole route segment has other well-ranked features with its varied

Table 5. Relation between the faculty of the participants and visual quality values.

	Corridors	Characteristics	P values	Significance levels
Faculty	Erzurum-Bayburt	Naturalness	0.004**	Very significant
		Scenic beauty	0.003**	Very significant
		Vitality	0.005**	Very significant
		Excitement	0.047*	Significant
		Recreation value	0.01*	Significant
		Colour effect	0.00**	Very significant
		Panoramic view	0.055	Insignificant
		Cultural value	0.003**	Very significant
		Confidence	0.002**	Very significant
		Originality	0.000**	Very significant
	Bayburt-Soganli Mount	Homogeneity and harmony	0.003**	Very significant
		Naturalness	0.213	Insignificant
		Scenic beauty	0.002**	Very significant
		Vitality	0.012*	Significant
		Excitement	0.133	Insignificant
		Recreation value	0.226	Insignificant
		Colour effect	0.008**	Very significant
		Panoramic view	0.041*	Significant
		Cultural value	0.021*	Significant
		Confidence	0.012*	Significant
	Soganli Mount -Of	Originality	0.004**	Very significant
		Homogeneity and harmony	0.042*	Significant
		Naturalness	0.666	Insignificant
		Scenic beauty	0.651	Insignificant
		Vitality	0.342	Insignificant
		Excitement	0.061	Insignificant
		Recreation value	0.153	Insignificant
		Colour effect	0.038*	Significant
		Panoramic view	0.044*	Significant
		Cultural value	0.346	Insignificant
		Confidence	0.011*	Significant
		Originality	0.143	Insignificant
		Homogeneity and harmony	0.369	Insignificant

*: P < 0.05 (significant), **: P < 0.01 (very significant).

topographic structure, vegetation, climatic characteristics and considerable amount of visual quality. Along the Karasu River, suggested activities include bird observing, camping, mountain cycling, horse riding, trekking, plateau tourism, botanical tourism, photo-safari, bungalow, while in the Bayburt-Soganli corridor, the River Coruh and Mount Soganli, bird observing, botanical tourism, grass skiing, nature walking on horse, trekking, photo-safari, mountain cycling, plateau tourism, fishing, and in the corridor between Soganli and Of paragliding, hotel and bungalow tourism, watching terrace, nature walking on horse, mountain cycling, photo safari, bird observing, plateau tourism, jeep safari, fishing, water skiing, ice skating may be suggested.

In sum, the Erzurum-Bayburt-Of highway is suggested to be scenic road with natural beauties and visual values

in addition to the tourism and recreational areas where people wish to go by finding opportunities for these activities. This road is in a position to be declared a scenic road by the Ministry of Culture and Tourism. It was found during the study that this road is not suitable for use in winter time; however, it can be utilised in every season if necessary measures are taken by Turkish State Highway Management.

Furthermore, in recent years, people have tended to go away from their homes for relatively short journeys, even for a day. Therefore, provision of alternative routes to those travelling in their private vehicles is especially significant. To provide for this new kind of travel, Turkish State Highway Management needs to highlight areas with scenic beauties on the existent maps or by preparing a detailed new map.

Table 6. Relation between the gender of the participants and visual quality values.

Corridors		Characteristics	P value	Significance level (P<0.05)
Gender	Erzurum-Bayburt	Naturalness	0.008**	Very significant
		Scenic beauty	0.700	Insignificant
		Vitality	0.256	Insignificant
		Excitement	0.003**	Very significant
		Recreation value	0.081	Insignificant
		Colour effect	0.417	Insignificant
		Panoramic view	0.117	Insignificant
		Cultural value	0.635	Insignificant
		Confidence	0.798	Insignificant
		Originality	0.787	Insignificant
		Homogeneity and harmony	0.423	Insignificant
		Naturalness	0.002**	Very significant
	Bayburt-Soganli Mount	Scenic beauty	0.366	Insignificant
		Vitality	0.219	Insignificant
		Excitement	0.005**	Very significant
		Recreation value	0.220	Insignificant
		Colour effect	0.497	Insignificant
		Panoramic view	0.850	Insignificant
		Cultural value	0.805	Insignificant
		Confidence	0.091	Insignificant
		Originality	0.699	Insignificant
		Homogeneity and harmony	0.603	Insignificant
		Naturalness	0.024*	Significant
		Scenic beauty	0.687	Insignificant
		Vitality	0.892	Insignificant
		Excitement	0.022*	Significant
		Recreation value	0.001**	Very significant
	Soganli Mount -Of	Colour effect	0.388	Insignificant
		Panoramic view	0.664	Insignificant
		Cultural value	0.085	Significant
		Confidence	0.247	Insignificant
		Originality	0.950	Insignificant
		Homogeneity and harmony	0.528	Insignificant

*: P< 0.05 (significant), **: P< 0.01 (very significant).

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