Study of Landscape Damage by Constructing a Cable-car on Halla Mountain

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Abstract

Development cannot be thoughtless for the environment and is to create a convenient and comfortable environment; thus, we should not take only economic factors into consideration as if automobiles cannot be valued more than human beings. People should be considered first because they are the ones who live in developed space; therefore, nature and people should be the main issue when development is planned.

This study is to organize these environment and development problems and suggest the fundamental application principle of ‘conservation first and development afterward’ by discovering problems and measures through the environmental simulation of the Ropeway that was one of major issues in the local community.

It is based on the simulation by using the Arc GIS program and Jeju local data from metrical maps (1/25000) of the national geography service. In addition, the scale modification has been conducted with the consideration of the size of buildings and measured data of the GIS maps.

We have discussed the current situation and problems of damage to scenery caused by development of the ropeway construction on Mt. Halla that is World Natural Heritage and essential to scenery factors of Jeju. The cause of the problems was created by development based on the economic logic with its methods with less regards for the local environment.

Therefore, it is also important to create urban landscape that fits for Jeju as the first stage of success to becoming Juju Free International City. It is very encouraging that the provincial office has recently formed teams for urban design to keep and maintain its scenery and landscape that fit for Jeju.

However, there are several problems to be solved before the effort to keep Jeju’s scenery and landscape makes steady headway. First, the problem of the overlap of administrative regulations should be solved. Second, there should be the consistency of the administrative performance. Third, the establishment of a objective standard for the creation of urban scenery based on culture. Fourth, a mature sense of citizenship is needed because there is a limit to administrative efforts to keep the urban scenery and landscape.

Keywords: Landscape, Damage, Construction, a Cable-car, Halla, Mountain, Conservation

I. Background & Purpose of the Study

Jeju Island is the largest island of Korea located south to the peninsula and leading resort and tourist destination that has been developed. Mt. Halla (1950m high), the highest mountain in S. Korea, stands in the center of the island and has beautiful scenery designated as World Natural Heritage by UNESCO (Picture 1).

However, the island has been substantially developed due to its beauty for the purposes of tourism and residential improvement. Consequently there have been damage to natural scenery and frequent occurrence of disasters causing a number of problems.
The typhoon “Nari” taught us a number of lessons in 2007. It was a good example that revealed the substantial influence of the result of the development-driven policy to all of us. In retrospect, policies of Korea had concentrated on development, and Jeju Province was not an exception. Its urban planning, housing policy as well as tourism policy had focused on development. Furthermore, it had even loosened controls on height of buildings and requirements of districts of large-scale projects to attract foreign direct investment with little regard for its environment and scenery. As a result, they had caused controversy over special favor and damage to environment and landscape. The typhoon “Nari,” however, have changed its people’s perspective and caused new change in the development-driven policy since 2007.

Development cannot be thoughtless for the environment and is to create a convenient and comfortable environment; thus, we should not take only economic factors into consideration as if automobiles cannot be valued more than human beings. People should be considered first because they are the ones who live in developed space; therefore, nature and people should be the main issue when development is planned.

This study is to organize these environment and development problems and suggest the fundamental application principle of ‘conservation first and development afterward’ by discovering problems and measures through the environmental simulation of the Ropeway that was one of major issues in the local community.

2. Influence on Landscape by Simulation

2-1 Analysis methodology

It is based on the simulation by using the Arc GIS program and Jeju local data from metrical maps (1/25000) of the national geography service. In addition, the scale modification has been conducted with the consideration of the size of buildings and measured data of the GIS maps.

2-2 Conditions

The following general application standard was applied for the simulation.

1) The basic data applied to the landscape data were based on the ‘Final Report of the Feasibility for the Ropeway Construction on Mt. Halla’ (Jeju Province, 2000), and it focused on the ‘Yeongsil’ trail of Mt. Halla.

2) In addition, the data about location of columns and 12 sites were based on the 2000 report, and the size and height of the columns were figured out according to the general standard:

   - Size of the bottom of the column: width×width, 5m×5m
   - Height of the column: 58m, but the height of the first and last column: 38m

3) The analysis was conducted based on the columns without cable cars.

4) Objectivity was given by using the Arc View Gis, Map Source, Google Earth and photographs of the sites with the 3-dimensional comparison and image change analysis. As for the 3D analysis by Google Earth, the number of columns was modified to 10 of them due to the location modification of the final terminal.

5) In addition, it was assumed that there was no difference between the image from the Arc View Gis analysis and photographs of the sites although there was a technical limit to modify the sight from the ground to a visual point of a person.

(3) Requirements and location of view points

Six view points were designated based on the geographical and geological factor including

1). Data of the review report of the ropeway construction on ‘Biyangdo’ island were applied.
two near trails to ‘Witse oreum,’ two in the hilly and mountainous region (1100 Road, Roe Deer Road), and two in the shore area (Circulation Road near new towns of Seogwipo City, ‘Haye’ district) (Picture 1). The first two view points were near; the second two were in the middle of the sites; and the last two were located in the far distance.

Picture 1. Location of view points in a close, middle, distant range

Picture 2. Location of viewpoints/final terminal & the path of column structures

Picture 3. Analysis of visual areas from the view points
(black line: paths of the ropeway, green line: parts of visible areas, red lines: parts of invisible areas, blue dot: part of the first barrier)

Picture 2 reveals the elaborated visual point, final terminal, installment path of column structures. It was assumed that there was no possibility of covers due to geographical barriers according the analysis of visuality from the six view points of the ropeway (Picture 3).

3. Effect on the Scenery by analysis result
3-1. Effect on the Scenery in a Close Range

(1) Effect analysis on the scenery from the close range view point 1 of a trail

The classification of viewscape and landscape depends on its scenery. The area to be installed with the ropeway has the high value of scenic landscape due to its beautiful scenery.

The close range view point 1 of one of the two designated trails is an important view point due to the overflow of hikers. It was almost the same result with the expectation by analyzing site photographs (Picture 4) and geographical images of analysis results (Picture 5 & 6) and comparing them. In other words, the analysis with Google Earth (Picture 5) and Arc Vew GIS (Picture 6) revealed that the view point would be seriously obstructed by the construction of the ropeway because it had geographical features that ran through the hilly and mountainous region from the top of Mt. Halla down to the seas.

Picture 4. Photograph of the site
In particular, columns of the ropeway across ‘jungsangan,’ the hilly and mountainous region, will create a negative image because they will look like a cluster structure depending on location of view points. When they are seen toward the ocean, they will cause damage to scenic landscape (Picture 7 & 8).

(2) Effect analysis on the scenery from the close range view point 2 of a trail

As it is seen in Picture 9, ‘Witse oreum,’ the highest hill, is one of the most beautiful features of Jeju and the trail of a number of hikes. According to the result of the simulation (Picture 10 & 11) of the site established by the photographs of the site (Picture 9), the distance between the ropeway structures and the scenery from the close range view point 2 of the other of the two trails was more shortened, and consequently it was assumed that the ropeway columns looked relatively much larger and caused scenery problems.
In particular, it was assumed (Picture 11) that the final terminal and the first and second column would destruct the magnificent scenic landscape of the ‘Bangnok’ pond on the top of Mt. Halla from the view point of the ‘Yeongsil’ trail; columns near the view point would create visual obstruction (Picture 12), and middle columns across the plain of ‘Senjakjiwat’ would destruct scenery of the plain and the seas of Seogwipo City (Picture 13) because they would look like a cluster structure depending on view points according to the result of the simulation.

3-2. Effect on the Scenery in a Middle Range

(1) Effect analysis on the scenery from the Roe Deer Road

According to the simulation result of the view point of the Roe Deer Road to the south of Mt. Halla, it was assumed that the prominent exposure of some (approximately four) middle columns would create a negative image to the scenic landscape from the middle region to the ‘Bangnok’ pond on the top of Mt. Halla; however, according to the comprehensive analysis result using Googel Earth (Picture 14) and Arc View GIS (Picture 15), the negative image to the scenic landscape was relatively less than the one from the view points in a close range.
(2) Effect analysis on the scenery from the 1100 Road

According to the simulation result (Picture 16 & 17) of the vicinity of the 1100 Road rest station, the most of the middle column structures would be exposed except for some but more than the ones near the view point of the Roe Deer Road.

Although there was less damage to the scenery comparing to the one in a close range, it is expected that the column structures would cause damage up to certain extent to the landscape near the 1100 Road rest station (where the magnificent scenery could be appreciated) that was valuable tourism resources with many visitors (Picture 18).

In particular, it is expected that the column structures would make an adverse scenery effect up to certain extent on Mt. Halla and the hilly and mountainous region due to the geographical features from the view points near the roads towards the final terminal (Picture 19).

3-3. Effect on the Scenery in a Distant Range

(1) Effect analysis on the scenery from the Circulation Road

There is a possibility of exposure of many column structures with consideration of conditions of the site (Picture 20) from the view point near the Circulation Road of new towns in Seogwipo City. In particular, damage to the scenic image near the top of Mt. Halla is expected up to certain extent due to the prominent exposure of the column structures; however, there would be less damage than the one in a close range according to the analysis (Picture 21).
(2) Effect analysis on the scenery from the villages along the seashore

It is expected that the middle columns would look like a cluster of them from view points near areas of ‘Jungmun-Andeok-Songaksan’ along the seashore according to the comparison of the analysis result of Google Earth (Picture 23) and Arc View GIS (Picture 24). It is also assumed that the most of columns would be exposed, but the effect on the scenic image would be significant comparing to the ones in a close and middle range.

4. Conclusion

4-1. Conversion into the Development Policy with the Esthetics of Slowness

So far, we have discussed the current situation and problems of damage to scenery caused by development of the ropeway construction on Mt. Halla that is World Natural Heritage and essential to scenery factors of Jeju. The cause of the problems was created by development based on the economic logic with its methods with less regards for the local environment. This culture of “Hurry, hurry” might be related to the development policy that started in the 1960s. A series of development had to be conducted to improve the primitive infrastructure of cities, poor living environment of farm villages, and many others in a poor condition those days. Consequently the esthetics of quickness smeared into our daily life, stimulated development of the nation, and supported a plenty of achievement in the society. The international community was surprised by Korea’s accomplishment in a short period of time, and the foreign press expressed...
it as the “Miracle on the Han River.”

Jeju was also influenced by the culture of “Hurry, hurry” and developed into the most popular tourist destination in the nation due to the development of tourist sites that started in the 1960s. However, Jeju has lost a plenty of significant features under the name of development logic during the period such as its beautiful shoreline obstructed by construction of coastal roads, magnificent scenic landscape blocked by commercial buildings and more. There have been attempts to apply the development logic to areas of natural scenic landscape including the recent ropeway construction controversy on Mt Halla. However, the simulation result revealed that artificial structures would cause serious damage to natural scenery, and this could be the loss of scenic resources.

In particular, Jeju Island is the World Bio Sphere, World Natural Heritage and World Geological Park designated by UNESCO. Jeju with these “triple crowns” is the first in the world, and it means that Jeju belongs to not only Korea but also the world. Jeju is also vying for the designation to be one of the World 7 Scenic Regions. Scenery is composed of natural landscape and viewscape of the daily life, and these two elements in harmony create beautiful scenery. The areas of three crowns of UNESCO are the natural landscape, and the environment of our daily life is the everyday viewscape.

However, unfortunately, our viewscape has been severely obstructed by a number of roads and apartment complexes driven by the administration, and these unattractive and large man-made structures caused serious damage to beautiful scenic landscape that was highly evaluated by UNESCO. Furthermore, traditional grass roofs of house were replaced by slate roofs, and traditional alleys, ‘olle,’ were changed into simply large roads. Nevertheless, the changes have been converted back into their original state including restorations of the ‘Sanji’ and ‘Byeongmun’ stream.

In advanced countries, they have spent a great amount of budget to restore the environment and support the civil engineering works for environment conservation. The Jeju province should also apply the philosophy of ‘Conservation First and Development Afterward’ to large-scale development projects of the road construction and civil engineering works. It is now time to start the new paradigm of the policy of civil engineering development to protect and keep the UNESCO-recognized environment and the space of our life by reflecting on the civil engineering works of the past.

4-2. Directions for ‘Conservation First & Development Afterward’

Therefore, it is also important to create urban landscape that fits for Jeju as the first stage of success to becoming Juju Free International City. It is very encouraging that the provincial office has recently formed teams for urban design to keep and maintain its scenery and landscape that fit for Jeju.

However, there are several problems to be solved before the effort to keep Jeju’s scenery and landscape makes steady headway.

First, the problem of the overlap of administrative regulations should be solved. There should be the main system with a new law on scenery to keep the environment within the range of the existing law on construction, national land planning and Jeju Free International City. The base for the establishment of urban scenery and landscape should be formed by those existing laws, and it should be supplemented by ordinances on urban scenery and landscape.

Second, there should be the consistency of the administrative performance. In the past, there was the inconsistency caused by different governors and officials of cities and countries of the province regarding policies and projects of architectural beauty and urban landscape. The uniform directions of administration should be established through the creation of scenery ordinances and review of them with guidelines.

Third, the establishment of a objective standard for the creation of urban scenery based on culture. The urban scenery should contain not only its physical environment but also culture and history.
Accordingly it is necessary to establish the standard for the urban scenery with elements that contain its Mt. Halla, ocean, dry streams, green space and cultural assets of Jeju.

Fourth. a mature sense of citizenship is needed because there is a limit to administrative efforts to keep the urban scenery and landscape. Its citizens should shed their old way of thinking about new administrative regulations for the urban landscape. They should understand that those new regulations are the least means to raise the level of urban culture and quality of our life.

References

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