Creation of Appealing Roadside Landscapes Using Elements of Prospect and Refuge Value

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Abstract

Aesthetic improvements to roadside landscapes presents many challenges to the road professionals. Lack of documented knowledge of local landscape preferences force them to import design treatments that may not evoke any preference feeling within the locals. Landscapes *with high prospect/ refuge values show high preference levels. Prospect can be defined as being able to see/understand more information while Refuge is defined being able to have a refuge. This study is aimed to identify preferable roadside design elements due to the high prospect/ refuge value associated. In an experiment participants viewed a set of 15 streetscape videos and identified prospect and refuge landscapes giving reasons for selection. Using, a standard qualitative content analysis two, three-step hierarchical conceptual models were developed to describe prospect and refuge landscapes.*

The prospect symbols were evoked from natural and artificial landscape elements At a more detailed level many Sri Lankan specific symbols were identified for the designers to work on. These included presence of coconut/ mango trees or painted structures, bus stand, fruit stalls, fish stalls. The refuge symbols resulted from natural &artificial landscape elements, space demarcation, road safety items, well designed & constructed roads, well maintained roads, place to stay, activities, road boundary demarcation, road structures, separated walking spaces. The outcomes of this work can be extended to design preferable roadside landscapes that are meaningful to road users.

Keywords: Prospect, Refuge, Roadside Landscape Symbolism, Design Elements

1   Introduction

1.1   Road side landscape

Roads are public property shared by thousands of travelers every day. Landscape is an important element in the planning, design, construction and maintenance of a road project. Appropriate planning, design, implementation and management of landscape treatments are vital for the safety of users, longevity of the assets and protection of the environment (Engineering & Technology Branch Queensland Government, 2013).

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People around the world on average spend 40 minutes for travelling one way for commuting each day (The SASI Group, 2006). In terms of leisure travel, the global travel market also continues to grow solidly to a level where, leisure travelling is outgrowing business travel(IPK International, 2013).In considering the number of hours people spend on the road, creation of visually attractive roads is vital to ensure a pleasurable and safe ride.

Being different from many other landscapes, roadsides create a unique and dynamic landscapes which vary due to variable road geomery, land use, geographical regions, cultural boundaries or climatic zones. This variations present many   challenges for the designing of landscapes. Fortunately, the researchers like Appleyard (1964) and Lynch (1960) have proposed roadside landscape design treatments based on symbolic meanings associated with roadside landscapes. As an example in his book "View from the Road", Appleyard has discussed how to use rhytms in music to create a pattern in urban roads (Appleyard, 1964). Designing roadside landscapes based on symbolic meanings have been attempted by the road officials since then. Prospect and refuge theory presented by Appleton (Appleton, 1975)is one such theory, widely used in landscape design (Annemarie & Michael, 2012)

This research attempts to investigate on the potential usage of prospect and refuge theory for the aesthetic design of roadside landscapes in Sri Lankan context.

Improving the scenic qualities along transportation corridors is becoming important (FHWA, 2006). Movements like America's Scenic Byways are encouraging people to travel along scenic routes simply to enjoy the landscape along the route (FHWA, 2006). Creation of such routes begins with aesthetic design on the roadside landscapes.

The highway landscapes in developed countries like the USA, Japan or England have extensively been studied by many researchers including pioneers like Apple yard and Sheppard (Sheppard, 1989).The landscape experience is influenced by the natural and human forces existing in the landscape as well as by the associated landscape meaning held by the users. Thus neither the outcomes of studies done in foreign countries nor the parameters used in such studies can directly be applied to the Sri Lankan context. This results due to differences in physical landscape dictated by tropical weather as well as the differences of road users inheriting eastern cultural values.

Thus a separate study should be conducted, to understand applicability of prospect and refuge theory for the aesthetic design of highway landscapes in tropical climates.

1.2   Prospect and Refuge symbolism in landscapes

The theory of prospect and refuge by Appleton (Appleton, 1975)is one theory widely applied by landscape professional in the design of general landscapes. The theory which describes the landscape preference as an evolutionary response inherent to human beings, proposes that the landscapes with prospect and refuge symbols to have higher preferences.   The Prospect is defined as being able to see/understand more information while Refuge is defined being able to have a refuge. In his theory Appleton had proposed some potential prospect landscapes such as direct panoramas, direct vistas, interrupted panoramas, secondary panoramas and deflected vistas. Similarly he has proposed higher refuge values to be present in places that afford hiding, shelters and penetrability.

1.3   Prospect and refuge theory in landscape research and design

Matsuzaki   (2010) has attempted to apply the above concepts to the design of pedestrian friendly streets in Japan. Ruddell and Hammitt (1987) used prospect-refuge related phenomena to examine visual preference for edge environments. Loewen, et al. (1993) used prospect-refuge theory as a foundation to analyze the relationship between urban environments and the degree to which people feel safe from crime. Stamps (2008a, b), researched environmental preference based on a series of large scale studies of the following four factors: "prospect (depth of view), refuge (presence of protective regions in front of the observer or possibilities of escape), direction of light (either front or back lighting), and venue (natural or built environment)".

Since the evolutionary response to landscape may be common to all human beings, the above theory may equally be applicable to the   Sri Lankan landscapes. Yet differences can be observed due to the differences of physical landscape and culturally associated landscape meanings.

1.4   Research Aims

This research is thus intended to propose suitable landscape design elements to create appealing roadside landscapes by applying the concepts of prospect and refuge to the tropical landscape context.

2   Methodology

2.1   Experimental method

Researchers attempting to understand the human perception independent of previous theories, often use approach of Grounded Theory in which the results would be grounded on the real observations and not on the previous theories (Patton, 1980). This qualitative research method attempts to generate theories based on close and detailed inspection and analysis of qualitative data so that the generated theories are clearly grounded on real world observations instead of existing conceptions (Breakwell, Hammnond, Fife-Schaw, & Smith, 2006). This study follows the method adopted by(Ohta, 2001), who used a grounded theory research design to understand the meaning of the landscape. A set of 15 video clips representing urban, suburban and rural landscapes were used as stimuli for the experiment. Semi structured interviews were conducted to evaluate and identify the prospect and refuge landscapes and to evaluate the related meanings. Each participant was shown a selected set of videos and instructed to identify either prospect or refuge landscapes as they watched the video. Upon identification of such a landscape, the video was paused and they were asked to give the reasons for identification. 62 voluntary participants spelled out a total of 96 prospect comments and 112 refuge comments. The answers were transcribed and a standard content analysis was done following a methodology similar to Ohta (2001). Two separate analysis were done to prospect and refuge landscapes.

3   Data Analysis

3.1   Content analysis

Taking a similar approach to Ohta (Ohta, 2001), the data analysis was done by using standard qualitative investigation approach based on grounded theory as detailed by Patton (Patton,

1980).The data was analyzed to identify key themes which described the landscapes with prospect and refuge value.

The comments describing prospect/ refuge landscapes were examined carefully to identify remarkable segments. Key themes within such remarkable segments were identified and a list of key themes was made. For this purpose the descriptions were re-examined to identify the important remarks and each   such remark was coded using the most suitable theme or themes. Two lists of key themes (one each for prospect and refuge) were made thereby. These key themes composed the level 1 key themes as shown in Table 1 and Table 2. Based on similarity of meaning among level 1 themes, these   were then grouped in to several groups. By studying the meaning within the themes of a group, new themes which reflected the level II themes were obtained.   A similar procedure was adopted to obtain a set of level III themes from level II themes as depicted in Table 3 and Table 4.

3.2   Synthesis of landscape design elements

The level III themes described different dimensions of landscape preference arising due to prospect/ refuge. Each of these was represented by themes at level I and II, usable to identify potential design elements. Also potential design elements were synthesized based on the experience of authors and referring to literature. From such potentially identified elements, a set of landscape design elements that could be applicable to Sri Lankan road context were synthesized for each of the level III themes.   However some of the level III themes were more conceptual. According to the theories of sociology, the meaning of something could be communicated through denotation (based on real object) or through connotations (via some other method which may indicate same meaning due to socio-cultural and personal associations) (Daniel, 2002). Thus in addition to indicating the landscape design elements which would be through denotation, several other design concepts which may indicate the same meaning through connotation were also synthesized. These are shown in Tables 3 and 4.

4   Results and Discussion

4.1   Landscape cues for prospect and refuge in Sri Lankan context

The prospect symbols consisted of 77, 35 and 13 level I, level II and level III themes respectively. The level III themes were Natural and artificial landscape elements, Landscape configuration, spaces, utility places, Land cover/land use, Activities, Architectural appearance, Proper Maintenance, Proper construction, Space demarcation, religious places, Evaluation and Potency. Except for proper construction and maintenance, the other level III themes showed similarities to observations about prospect symbols in other countries. In terms of level I themes, the trees, green, flowers are some of the frequently mentioned. In two instances mango and coconut were mentioned reflecting the culturally held prospect values. At the level III these were summed up to get natural and artificial landscape elements. Afterwards by considering the themes highlighted by the participants and based on authors understanding about culturally valued landscape elements, a set of landscape design elements were synthesized. As an example, Mango, Coconut, Na, Palmairah, aricunut were synthesized as they represent strong prospect values culturally.   These denotative landscape elements synthesized   reveals, many physical design elements. But in some cases, the actual road context may not permit the placement of aforementioned features, such as planting trees. The connotative concepts shown in Table 3 could be usedto elicit some degree of preference through prospect/ refuge value. In such a context the connotation of green could be reflected by painting a wall in green or painting

images of trees on walls. Previous research work(Samarasekara, 2010) have shown the potential of connotative meaning to elicit preference.

As shown in Table 3 Utility places, space demarcation, and religious places also have many design elements to create prospect values. Traditionally highway engineers discourage the presence of sellers on roadside due to safety concerns. But in places where safety is not compromised, allowing a king coconut seller, corn seller creates a prospect value for a passer-by. Those who stop by atsuch shops would really experience the prospects of buying something and connecting with locality, while even the passers-by will enjoy the journey through the prospect value created by seeing such sellers. Presence of destinations providing utility has been identified as a key feature in livable streets in which people prefer to walk(Walkscore, 2007) and socialize(Vikas, 2007),(Whyte, 1980). Further at the connotative end, the road engineers can create prospect value of sellers by merely showing such boards or creating some streets arts of such places.

Both prospect and refuge themes include two factors, evaluation and potency which reflect some of the main factors of Osgood scales(Osgood, 1957). By nature, these do not form physical design elements. But based on the context, connotation possibilities could be brought forward.
The refuge symbols consisted of 90, 54 and 18 level I, level II and level III themes respectively. The level III themes were Evaluation, potency, utility places, Natural & Artificial landscape elements, Space Demarcation, Road safety Items, Well designed & constructed roads, populated areas, Well maintained roads, place to stay, Activities , space provision ,Land cover/land use, Road boundary demarcation, road structures, separated walking spaces, Architectural Items and road side used for other purpose. Similarity with foreign roadside landscapes at level III was observed. In a country where pedestrians are associated with high vehicle accident risk, most of the refuge symbols were based on pedestrian space definition and demarcation. These included the desire to exclude have some road side elements.

Presence of coconut/ mango trees or painted structures, bus stand, fruit stalls, fish stalls are some of local prospect symbols. Participants have often mentioned that "coconut tree" gave prospect feeling for them. In a Sri Lankan context coconut refers to prosperous place. Therefore this study has been able to elicit some Sri Lankan symbols for prospect and refuge. Thus, an understanding about preferable local landscape elements is more important to do the best landscape design suitable for Sri Lanka.

This research proposed some road side design elements based on a set of road user opinions and professional conceptualization. Future research work should confirm whether these each of these can create significant preference among road users. Observations of Tables 3 and 4 reveals some level III themes and respective design elements are common for both prospect and refuge especially due to synthesizing. The repeating elements were kept, since these elements would ultimately create reveal preference, either through prospect or through refuge. A separate study would be required to distinguish such preference.

5   Conclusion

The success of transport infrastructure depends not only on their function but also how they are perceived and preferred. A negatively perceived roadside is often underutilised even if they have a Level of Service A. In an attempt to identify characteristics/ qualities meaningful roadside landscapes that evoke preference, this study identified 13 and 18 prospect and refuge themes for the landscape designers to work on. The inclusion of these in designing landscapes can create

landscapes that would be preferred in a local context. Also the themes at levels II and III can further be developed by introducing them based on their connotative meanings as well.

Most of the level I prospect and refuge themes were landscape elements. The other prospect symbols included local places of utility provisions as well as spaces. The level I refuge symbols included spaces for pedestrians and means of pedestrian separation.

This study proposed some symbols that may evoke prospect and refuge feelings. Future work should further investigate on techniques of applying these identified and the degree of preference for the identified.

6   References

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Table 1: Level I Prospect Themes

Prospect (1)	Good (1)	Rest (2)	Walk (3)
Absence of fish stalls (1)	Plant (1)	Sea (2)	Flyover (4)
Benches (1)	Pedestrian spaces (1)	Traveling (2)	Sky (4)
Boundary (1)	Plantation (1)	Waiting (2)	Safe (4)
Clear image (1)	Pretty (1)	Watch (2)	Absence of cables (4)
Clock tower (1)	Relax (1)	Foot walk (3)	Temple (4)
Coconut (1)	Riding (1)	Block paving (3)	Visit (4)
Crossing line (1)	River (1)	Bus stand (3)	Calmness (5)
Flower bed (1)	Road marks (1)	Buy (3)	Clean (5)
Look around (1)	Rural (1)	Clear road (3)	Pleasure (5)
Free of debris (1)	Separated space (1)	Environment (3)	Cool (6)
Freedom (1)	Nicely park Fish boats (1)	Absence of Poster (3)	Flower (6)
Mango trees (1)	Tired less (1)	Green environment (3)	Comfortable (7)
Street lamps (1)	Way of road constructed(1)	Lake (3)	Space (8)
Huge trees (1)	Wire cut brick wall (1)	Place to stay (3)	Pleasant (9)
Large (1)	Neatness (2)	Scenery (3)	Attractive (10)
Like (1)	Natural (2)	Sea beach (3)	Nice (13)
Flower pots (1)	Park (2)	Shops (3)	Beautiful (20)
Fruit stalls (1)	Parking (2)	Silent (3)	Trees (20)
( ) - Values within brackets indicated the number of instances a particular theme was mentioned within prospect descriptions			

Table 2: Level I Refuge Themes

Fence(1)	Road lane(1)	Water edge(1)	Sign boards(2)
Happiness(1)	Surrounding(1)	Jogging(1)	Well maintained (2)
No tiredness(1)	Tired(1)	Good(1)	Restaurant (2)
Clearly seen road(1)	Travelled by foot(1)	Easy to buy things(2)	House(3)
Rural look(1)	Railway crossing with gate(1)	Green environment(2)	Busy area(3)
Calmness(1)	Large crowd(1)	Plant(2)	Benches(3)
Place to stay(1)	Brick work(1)	Road alignment(2)	Separated spaces(4)
Look around(1)	Open area(1)	Highly populated (2)	Huge trees(4)
Lake(1)	Parapet walk(1)	Straight road(2)	Shops near by(4)
Like(1)	Building(1)	Lane(2)	Spaces beside the road(4)
Freedom(1)	Attractive(1)	Road marking(2)	Beautiful(5)
Not highly populated(1)	Crossing line(1)	Easily(2)	Walking spaces(6)
Minimized the accidents (1)	Traffic light (1)	Widening & level (2)	Nice(6)
Road shoulders (1)	Flower(1)	Drive(2)	Trees(7)
Edge lines(1)	Clean road(1)	Painted structures(2)	Clear(7)
Side drains(1)	Street lamp(1)	Guard rails(2)	Foot walk(8)
Properly designed(1)	Boats(1)	Sheltered(2)	Comfortable(9)
Properly (1)	Culvert(1)	Rest(2)	Space(15)
Foot path(1)	Crossing mark(1)	Enough space (2)	Vehicles Park(17)
Secured place(1)	Dangerous(1)	Boundary wall(2)	Safety(45)
Temple (1)	Careful (1)	Cool (2)	
Religious(1)	Absence of unauthorized posters (1)	Planting flowers(2)	
Peaceful(1)	Barriers (1)	Shop(2)	
( ) - Values within brackets indicated the number of instances a particular theme was mentioned within refuge descriptions			

Table 3: Level III themes and proposed design elements (denotation) and design concepts (Connotation) for Prospect

Level III theme	Proposed design elements- Denotations	Design concepts - Connotations
Natural and artificial landscape elements	Trees (Mango, Coconut, King coconut, Aricunut, Kithul, Palmairah, Na), Flower beds, Flower pots, bushes (Wathusudu, Andara, Daas etc.), Grass, Street Lamps, Benches, Fountains, Stones	Natural, Green
Landscape configuration		Imagable, Clear
Spaces	Pedestrian Spaces, Side walk, Parking Places, Fly-over, Play areas	Separation of Space
Utility places	Fruit stalls, shops, bus halt, park, Vegetable stalls, Fish stalls, Green Leaf stalls, King Coconut Stalls, Home accessory shops, markets	Utility
Land cover/land use		Plantations, River, Sea, Lake, Beach, Sky
Activities	Places to stay	Look around, Ride, Watch, Walk, Visit
Architectural appearance	Benches, Flower pots, Clock tower, Interlocking blocks, Bus halts	
Proper Maintenance		Painted structures, Utility posts
Proper construction	Interlocking blocks	
Space demarcation	Road markings (White lines), Crossing Lines, Bollards, Raised sidewalk	Crossing sign
Religious places	Temples, Pagodas, Church, Mosque	
Evaluation		Neat, Clean, Natural
Potency		Pretty, Relax, Rest, Calm, Pleasant, Attractive, Comfortable

Table 4: Level III themes and proposed design elements (denotation) and design concepts (connotation) for Refuge

Level III theme	Proposed design elements-Denotations	Design concepts - Connotations
Evaluation		Proper, Clear, Safe
Potency		Happy, Calm, Free, Peaceful, Careful, Comfortable, Easy
Utility places	Restaurants, Fruit stalls, shops, bus halt, park, Vegetable stalls, Fish stalls, Green Leaf stalls, King Coconut Stalls, Home accessory shops, markets, Bus halts	
Natural & Artificial landscape elements	Trees, Flower beds, Flower pots, bushes, Street Lamps, Benches, Fountains	Natural, green
Space demarcation	Road markings (White lines), Crossing Lines, Bollards, Raised sidewalk	Crossing sign
Road safety Items	Fence, Traffic Lights, Railway crossings, Street lamp, guard rail, Sign Board	
Well designed & constructed roads	Shoulders, Road alignments	Wide road, Level road
Populated areas		Highly populated, Busy area
Well maintained roads		Painted structures, Well maintained, Absence of posters
Place to stay	Temple, Shelters, Space beside road	Separated space
Activities		Walk, look around, jog, rest, drive
Provide spaces	Surrounding places	Spacious
Land cover/land use	Lake, Water edge, Open area	Rural look
Road boundary demarcation	Road markings (White lines), Crossing Lines, Bollards	
Road structures	Side drains, Culvert	
Separated walking spaces	Side walk	
Architectural items	Brick work, Interlocking blocks, Bus halts	
Road side used for other purpose		Boats on road side