



Visual characteristics of roads: A literature review of people's perception and Norwegian design practice



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ABSTRACT

Several projects and measures have been developed to enhance the design of public roads. Nevertheless, the critics of their design remain numerous. To further the discussion on road aesthetics, this paper makes suggestions for a more consistent terminology and presents a theoretical framework for assessing the visual quality of roads. Based on a literature review, twelve visual characteristics are identified: coherence, imageability, simplicity, visibility, maintenance, naturalness, integration, contrast, variety, aesthetics of flow, legibility and orientation. These characteristics are presented and described and where possible their theoretical and empirical backing is given. Only a few visual characteristics in road design have been subjected to empirical perception studies, so their importance for road users and residents remains unclear.

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1. Introduction

Norway was the first of 37 countries to ratify the European Landscape Convention adopted by the Council of Europe (CoE) in 2000. The convention aims to promote “the protection, management and planning of European landscapes” (CoE, 2010) and emphasizes the importance of outstanding as well as every day and degraded landscapes (CoE, 2000, Art.2). Many of our every day landscapes are affected or dominated by roads and streets, which are no longer seen as simple connections between places but as places in their own right (Jackson, 1994; Merriman, 2004). Additionally, roads represent “one of the most widespread modes of landscape perception today” (Girod, 2010a) and often give us “a first impression of the landscapes we are visiting” (Junta da Andalucía, 2009, p. 39), underpinning their importance in our everyday life.

Nevertheless, critics targeting the design of roads and their elements, especially in suburban areas, have been and remain numerous, claiming: a lack of individual character or identity, too gray in design, too functional or too monotone (cf. Appleyard et al., 1966, p. 3; NRK, 2010). Results of landscape visual quality research also show that they are mostly perceived as negative “man-made elements” (Arriaza et al., 2004; Clay and Daniel, 2000; Garré et al., 2009).

To address this, aesthetical issues have become more and more valued in the road planning praxis in the last decades, and this is also true in Norway, where, for example, the National Tourist Routes project has received a lot of public and professional attention (SVV, 2010b). The Norwegian Public Roads Administration Statens Vegvesen (SVV), which is responsible for the public national and county road network, has also strengthened its aesthetical emphasis in practice. It has, for example, increased the number of landscape architects in their staff from 1 to 100 between 1975 and 2010, becoming the country's largest employer of landscape architects. Additionally, this authority recently enacted the “Intern Strategy for Promoting Good Architecture” to promote life quality, welfare, and sustainability as well as attractive, functional and universally designed places (SVV, 2012).

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To encourage improved road design, the Norwegian Public Roads Administration introduced the “Beautiful Road Award” (“Vakre Vegers Pris”) in 1988. This award, as well as the national road awards of the four Scandinavian neighbor countries (introduced in the 1990s), uses aesthetical aspects as one of the major evaluation criteria, as well as innovation, safety and environmental aspects. In her work about the Beautiful Road Award in Norway [Løset \(2009, p. 2\)](#) claims that it “has an inspiring effect on aesthetical thinking in road projects”, but that the ideas about what is a beautiful road vary greatly between the members of the jury, and apparently do not always conform to the profession’s ideal of a well-designed road ([Løset, 2009, p. 62](#)). In fact, there is uncertainty about the profession’s ideal well-designed road, since none of these awards work with transparent evaluation criteria to judge the beauty or “good aesthetic qualities” of a project. Actually, this is surprising, considering the numerous existing aesthetical recommendations, which can be found in the road planning literature and praxis.

A comprehensive approach for assessing the aesthetical qualities of roads is missing not only in the Beautiful Road Awards but also in the daily road planning, e.g. when reviewing or approving road projects. Discussion around the theory of road aesthetics is very limited, despite the fact that roads are such an important part of our landscape. This lack of a theory based approach to road aesthetics might also be the reason for the loose and varied terminology used in the field. A standardization of terminology is in turn necessary to “develop means by which the more routinely successful designers can record their observations and aesthetics advice for prosperity in meaningful terms” so that it becomes easier to share the results of studies and observations with colleagues ([Burke, 2004](#)). [Forsyth et al. \(2007, p. 83\)](#) also explain that “having a common language for assessing the particular strengths of roads, station areas, bridges, and other transportation related places can do much to further public debate about such important concerns.”

Public debate about road aesthetics is important, since roads, like architecture, have a strong public character. They are not only often financed with public resources, but people are exposed to them in their daily environments and can rarely choose whether they want to “experience” them or not ([Nasar, 1999, p. 1](#)) One possible way to create roads and other public spaces which match the taste and aesthetical demands of the public is to “integrate extant knowledge of environmental preferences into design” ([Nasar, 1988, p. 393](#)). This is of particular significance as differences and discrepancies regarding the road experience of laymen (e.g. residents, road users) and professionals have been widely recognized, in, for example, road and landscape perception studies ([Brown and Gifford, 2001](#); [Brush et al., 2000](#); [Forsyth et al., 2007, p. 73](#); [Kaplan and Kaplan, 1989](#); [Rogge et al., 2007](#); [Tessin, 2008](#); [Vouligny et al., 2009](#)).

To study and understand people’s perception and evaluation of landscapes, several theories of landscape perception and aesthetics (e.g. [Bourassa, 1990](#)), as well as frameworks for assessing landscape quality, have been developed in the field of landscape aesthetics. Here especially the review papers from [Zube et al. \(1982\)](#) about landscape perception research, as well as the work from [Lothian \(1999\)](#) about landscape quality assessment, give a good overview, and provide structure for the existent literature in the field of landscape aesthetics. In this context the review work of [Tveit et al. \(2006\)](#) provides a comprehensive theory-based framework for analyzing the visual character of landscapes. However, the identified visual concepts cannot directly be transferred to road projects, but must be adapted to the specifics of roads which in their nature are both: landscapes, landscape elements, and constructions, with quite technical elements.

2. Aim and scope of this review

Despite the importance of roads for our everyday life, they face frequent criticism regarding their design. The discussion about road design and the approaches to judge and enhance the aesthetical qualities of road projects should be improved.

Although the field of aesthetics includes the entire range of sensory experiences, this paper will concentrate on visual aspects. One reason for this is that the analyzed road literature uses the term “aesthetical” almost exclusively for visual aspects, possibly because vision is the “principal sense” used while driving ([Appleyard et al., 1966, p. 4](#)).

This review is therefore aimed at identifying visual characteristics of roads which influence human aesthetical response and which can be used in a theoretical framework for assessing their visual quality. This study will contribute to a more consistent terminology for road design. The visual characteristics will be compiled through a review of the current state of the art via the road design literature. To ensure that the aesthetic demands of the public are taken into account, this review shall investigate the theoretical assumptions and empirical data on which the characteristics are based, and whether they correspond to findings in the field of preference research related to roads and landscapes. To delimit the scope, this study focus on “everyday roads” which are here defined as both streets and roads which include car traffic, which are areas people move along during their daily lives and which are not necessarily designated as a scenic routes ([Jones and Daugstad, 1997](#)) are under “protection” (cf. [SVV, 2002b](#)) or designed as “architectural art”, e.g. the “National Tourist Routes in Norway” ([SVV, 2010b](#)).

3. Method

3.1. Reviewed literature

To obtain an overview of existing, actual visual design principles in the road design praxis in Norway, different kinds of publications dealing with the physical design of roads have been reviewed (see [Table 1](#)).

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