

SENSORIAL STRATEGIES IN THE DESIGN OF PUBLIC MEANS OF CONVEYANCE

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Abstract: *The present paper wishes to establish new criteria regarding the aesthetic revitalisation of public means of transport in the big cities of Romania, using the principles of sensorial design. Unlike France, country in which the public transport systems in big cities have been reconfigured and permanently improved by adopting new technical solutions, new materials and upholsteries, in Romania, the rough economic context from the last decades led to the purchase of used vehicles from the West; fact which gradually led to the increase of the aesthetic level of pollution in big cities. Taking into account that in the near-by future one cannot see any financial solutions for renewing the vehicle parks, in Iași, the TRAMCLUB NGO initiated the project “The aesthetic revitalisation of RATP [1] Iași public means of transport”, in partnership with RATP Iași and two private companies as sponsors. The project foresees the aesthetic integration of means of transport in the urban aesthetics through a chromatic unification and increasing the quality of the travel experience by adopting a unitary upholstery resistant to wear and with a high level of washability. With the support of the Faculty of Visual Arts and Design (“G. Enescu” University of Arts, Iași), a workshop for students of all study years was organised, with the purpose of choosing the best version of chairs reupholstering, in full accordance with the new visual identity.*

Keywords: *public transport, ecology, urban aesthetics, upholstery, textile materials.*

1. INTRODUCTION

Having a powerful impact on the social environment, the passengers public transport represents a mean of sustainable development of urban mobility through neighbourhoods revitalisation and last, but not least, through the emphasis of architectural and cultural patrimony. With a long life duration (approx. 40 years for trams), public means of conveyance can be associated in time with the image of the city which owns them. In Romania, the difficult economic context from the last decades led to the purchase of used public transport vehicles from the big European cities. The non-unitary character of public means of transport, both stylistically and chromatically, gradually led to the increase of the aesthetic level of pollution in big cities of Romania. Taking into account that in the near future one cannot see any solutions for renewing the vehicle parks, in Iași, the TRAMCLUB NGO of Public Transport Enthusiasts initiated the project “The aesthetic revitalisation of RATP Iași public means of transport” (coordinator: Teodor-Stanciu Silviu), which foresees vehicle integration in urban aesthetics. Adopting a unique chromatic pattern and unitary upholstery for public means of transport, in full accordance with identity elements of Iași, represents a significant step in achieving the goal.

2. GENERAL INFORMATION

An important cultural, economic and academic centre, Iași can be considered a city of national premieres, this being the place of the first university, first typography, first botanical gardens, the urban development of the 18th – 19th centuries being made after Western Europe referential examples. Thus, in Iași started to work certain programmes of tree planting along the main boulevards or in the public gardens. According to historical sources, the present Carol I Boulevard (Copou area) was known as the

Green Bridge due to its elegant gardens made under the ruling of Grigore Matei Ghica and later, under that of Ion Callimah. Later on, the scholar Gheorghe Asachi revolutionised the city's modernisation and development process, applying technical solutions taken from the great European capitals. He redesigned, along with his students from the School of Roads and Bridges, the Copou Boulevard in 1812 after a Spanish concept, planting linden trees at regular intervals on both sides of the road. In the 20th century the process of linden tree planting was extended through the entire city, Iași gaining in time the name of *Linden tree city*.

Choosing green as the main colour in the identity of RATP Iași public means of transport is also sustained by its significances in an urban context: balance, visibility, freedom, cleanness and last, but not least, ecology. 116 years old, the public transport in Iași began to exist along with the exploitation of the first AEG electric trams, these being delivered to Iași with a special colour pattern, composed of three shades of green. During time, the tram represented the main means of conveyance, the network being extended through the city's main neighbourhoods. After the rehabilitation works of the tram running track, still in work, this will become once again starting from 2016, the main means of conveyance in Iași. Sustainable, economic and silent, the tram is by excellence an ecological vehicle and the fact that green was adopted emphasizes the development direction of the public transport in Iași through the care for the environment.



Fig. 1: Criteria in choosing green for the new visual identity of RATP Iași

A really important aspect in finishing the project is represented by the new interior design of the vehicles. The direct contact of the passenger with the furnishing elements in the passenger compartment of the tram or the bus, demands the maintenance of certain minimum hygiene norms. By adopting a quality material, washable and resistant to wear would lead on a long term to a maintenance of the pleasant aspect of the vehicles, an essential criteria in attracting people to use public transport instead of the personal car. Customizing the upholstery in accordance with the key elements of Iași, both from a chromatic point of view, as well as a graphic one, implies a full integration of vehicles in the urban aesthetics, emphasizing the architectural and cultural values of the city. Creating an integrated identity attracts many benefits, from an improvement of the entire image of the city, to an encouragement of the citizens of Iași and tourists to use public transport.

A referential world example of a good adaptation, aesthetically and functionally, of means of conveyance to the particularities of each city, is France. During the last decades this country was the witness of a less known phenomenon to the wide audience: the “revival” of the tram. Reinforcing the tram transport system attracted urban modifications, from the reconfiguration of certain arteries, to the adjustments of both street furniture, as well as the one used in tram stations. A very important contribution to this process of reviving the urban passenger conveyance was brought in by numerous designers, architects, landscapers, and at the same time, plastic artists. The Alstom Company, a company which built railway rolling stock helped in making a custom design of trams according to the representative elements of the beneficiary cities. The increase of the level of life quality in the contemporary society imposed the identification of proper means of design for consumer products. Thus, the design system was rebuilt around sensorial perceptions which the product offers to the beneficiary [2]. This fact implies an extensive research process of the way in which the product answers the functional, aesthetic, tactile and auditory needs of the user [3]. The sensorial evaluation aims at quantifying and describing systematically all human perceptions generated by using a certain product. The result allows researchers to establish certain precise and quantifiable specifications and requirements, subordinated to the first four human senses: olfactory, visual, tactile and auditory [4]. Thus, a list of criteria was established: finish/ colour/ accessories/ aspect/ sounds made by the product during usage/ smell/ temperature/ luminosity, applicable in various categories of products. Sensorial design is directly responsible for the change of paradigm of the technical field in relation to the individual [5], creating through interdisciplinary connexions (visual arts, marketing) a link between

the product and the user. The purpose of sensorial design is that by relating to human perceptions during the stages of the design process, to lead to a progressive improvement of the product quality in relation to the individual's needs.

In the field of public transport, the sensorial analysis means improvements, sometimes small in what concerns design, applied to the interior of vehicles, to the information system or stations design, in order to optimize the travel experience [6]. The French agency RCP (Régine Charvet-Pello) Design Global [7], has an impressive project portfolio which seek to change the traveller's perception on the public transport system. Thus, numerous innovative solutions such as passenger conveyors from the Paris Montparnasse Railway Station or the customized design of trams built by the Alstom Company took shape. Looking beyond the industrial and urban conventions of our days, RCP uses the *Sensolab* concept in order to add more value to the user's life quality. Sensolab is a division inside RCP, which focuses on applying quantifiable criteria of human perceptions into the process of industrial design, through two interdependent approaches – sensorial evaluation and sensorial design. The first four human senses: olfactory, visual, tactile and auditory become the central point of an extensive research programme destined to create a more comfortable travel environment for the passengers. The RCP researches also aimed the chair upholstery used in public means of transport. It is known the fact that textile materials retain odours and get dirty, affecting the quality of the trip from an olfactory and visual point of view. As an experiment, the upholstery has been fitted with a diffusion system of fragrant odorous substances which were emitted in the moment one used the chair. Supplementary research showed that the olfactory perception of the individual is subjective, the task of establishing a universal consensus regarding a “pleasant odour” being a difficult one. Also, hiding an unpleasant odour with other so-called pleasant ones is not a sustainable solution. Taking into account all these aspects, the aim was to create a material with the capacity to absorb odours. This feature of upholstery could maintain a neutral environment in public conveyance vehicles. Also, the new technique could significantly contribute to the public's perception on the vehicle, offering for a longer time the feeling of novelty and cleanness. The material was applied on the latest model of tram, Citadis [8], produced by Alstom in collaboration with RCP, for the French city of Tours. The chromatic connection of the textile material with the wood and plastic elements of the interior furnishings, emphasize the vehicle's personality in relation to the urban aesthetics, offering the passengers a new perspective on the travel experience.



Fig. 2: Sensorial design principles applied in the design of the Alstom Citadis tram for the city of Tours

Taking into account the difficult economic context, in Iași, as in most of the cities in Romania, one cannot see any solutions for renewing the vehicle parks in the near future. The project “The aesthetic revitalisation of RATP Iași public means of transport”, in partnership with RATP Iași and two private companies as sponsors, foresees public transport vehicle integration in urban aesthetics by unifying the chromatic aspect and the quality increase of travel experience by adopting a unitary upholstery, friendly and durable. With the support of the Faculty of Visual Arts and Design (“G. Enescu” University of Arts, Iași), a workshop for students of all study years was organised, with the purpose of choosing the best version of chairs reupholstering, in relation to the principles of sensorial design. For three weeks study visits were made at RATP Iași in order to analyse the current state of the approximately 250 trams and buses from the park. The purchase of used means of conveyance from the big western European cities for two decades led to a dissolution from an aesthetic point of view of the vehicle park. Although RATP permanently sought to purchase, as much as possible, the same type of vehicles in order to ensure their maintenance, many of them have been extensively modernised in

their origin cities. This fact is obvious especially in the different design of the passenger compartments, both functionally, as well as aesthetically. In various colours, inside the vehicles we encountered various types of chairs and upholsteries, as well as various types of furnishing layout. Altogether, we identified ten distinct variants of interior design of passenger compartments, an aspect which raises the level of complexity of the project. For a complete compared analysis, between the decades-old solutions and modern ones, we made a new visit, this time to the Wagon Factory Electroputere VFU Paşcani. The factory is specialised in repairing and modernising train wagons, and for the last four years, in modernising and reconstructing tram wagons, along with the making of the GT 4 M [9] prototype for Iaşi. During the visit we analysed various types of textile materials used in this industry, as well as the evolution during time of four types of textile upholstery used in modernised wagons. Choosing the materials was not a random one, in the Blue Hexagon and Green Hexagon wagons upholstery being chromatically adapted to the name of the vehicles (blue, green), but as well as stylistically by impressing a composition of geometric motifs which automatically describe the product – Hexagon.



Fig. 3: Study visits at RATP Iași and Electroputere VFU Pașcani / Sensorial analysis

After the compared sensorial analysis, new criteria that the new material should have were identified. Thus, the use of a high quality material is imposed, material which is resistant to wear, elastic and waterproof. Although synthetic leather, used in approximately 30% of the RATP vehicles, offers some advantages in the case of the cleaning process, it does not answer the passenger's tactile needs (hot in summer/ cold in winter) and visual needs. Thus, the high degree of washability of the new textile material becomes a very important criterion. Also, the upholstery must be in full accordance with the new visual identity of RATP. So, the nine students involved in the workshop have elaborated numerous graphic variants of customising the upholstery, starting from a series of key words such as vegetation, linden, ecology, dynamism, urban. The adopted colour spectrum is in full accordance with the shades of the linden tree leaf and flower. The customisation of the upholstery would have been made through impressing or embroidering. Nevertheless, due to financial reasons and maintenance of vehicles, the decision of adopting a mass produced material, accessible and durable, was taken. Thus, the material supplier offered a full range of textile materials from the indicated chromatic palette.

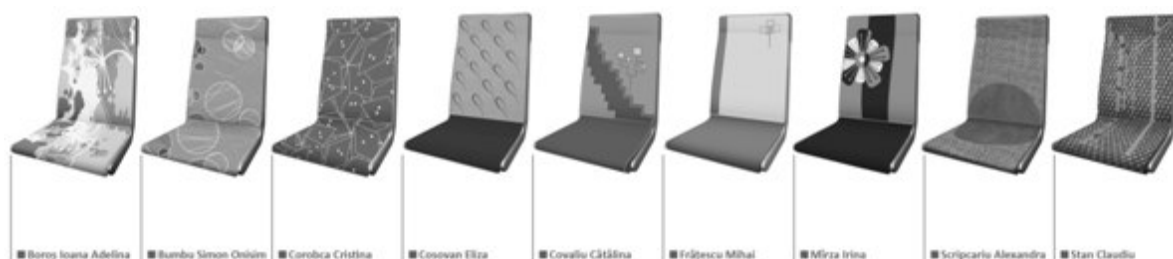


Fig. 4: Customised upholstery variants

The chosen material is part of the *Antara Plus* [10] range, being used both in furniture industry, as well as in the auto industry. The material is resistant to wear due to the plastic mass insertion on the back side. This offers elasticity and adherence to the sponge holder, preventing the deterioration of the material in the areas with corners or sharp edges. Also, the plastic mass insertion does not allow the laddering of the fabric when cut, due to which perimeter hems are not required, time and financial resources, being saved. The texture of the material offers comfort to the passenger and a refined aspect to the entire passenger compartment (tram/bus). Named *Lind Green*, the chosen shade fits in the chromatic spectrum of the new visual identity of RATP Iași, finishing the process of integrating the public means of conveyance in the urban aesthetics. The final stage of the workshop meant designing the model of a tram chair, in three steps: repainting the frame of the chair and rebuilding the necessary parts to fix the upholstery, applying the sponge layer (thickness 1 cm), fixing the upholstery. The creative and educational features of the workshop offered the students the opportunity to come in contact with specialists of the partner institutions and of applied working, in real time. The interdisciplinary component of the project contributes to the efficiency of adopting aesthetic parameters, as well as to saving work time and economic resources.



Fig. 5: Choosing the material / Making the model

3. CONCLUSIONS

The project will take place in two stages, in the first one the revival of a tram, respectively a bus, from an aesthetic point of view being proposed, and in the second one, the process would generalise over the entire vehicle park (2 – 5 years). The advantages of implementing the project are many, from creating a visual identity for the local transport administration, with direct effects on improving the city image, to the increase of comfort during the trip. By replacing the old upholstery with a customised, friendly, washable and resistant to wear material, the change of the passengers' negative perception of the experience of going by tram is desired. Also, one of the aims of the project is making the public aware of the advantages of using the ecological public transport system at the expense of the personal car. This fact would sustain on an average and long term the process of sustainable modernisation of the big cities in Romania, not only from an economic point of view, but from a cultural one as well.

PROJECT RESOURCES	
INITIATION / DESIGN	TRAMCLUB NGO Iași
EDUCATIONAL	“George Enescu” University of Arts, Iași
ECONOMIC	National Paints Romania, Rosini Design



Fig. 5: Before / After

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- [6] Railway Gazette International, *Sensolab drives interior experimentation*, 2007.
- [7] RCP Design Global is a design agency with headquarters in Paris and Tours, France. Founded in 1986 by Regine Charvet-Pello, the company is specialised in sensorial design of public transport vehicles, of street furniture, as well as in interior design of public spaces which belong to the railway transport system.
- [8] Citadis is a modular, last generation tram, built by the French company Alstom. The vehicle's body is standardised, and the wagons can be customised by replacing the terminal modules.
- [9] GT 4 M – GT 4 tram rebuilt and modernised at the Wagon Factory Electroputere VFU Pașcani (2011-2013), the letter "M" coming from "modernisation".
- [10] Antara Plus fabric – Country of origin: Belgium; Composition: polyester; Width: 140 cm; Weight: 338 g / sqm; Tensile strength / breaking: - Warp 561.44 n - Thread 1217.35 n; Moving the threads in the seam: - Warp 2.46 mm - 3.55 mm thread; Resistance to abrasion: - In the dry state: 5 - In the wet 4/5; Resistance to pilling 4/5.