SAFETY AND QUALITY IN URBAN AREAS: STRATEGIES, TOOLS AND TECHNIQUES TO PROMOTE PEDESTRIAN MOBILITY

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INTRODUCTION

The research, that is dealt with in this note, starts from the awareness that traffic, due to its many negative consequences, is one of the main causal factors of the de-qualification process that is taking place in most of the Italian urban areas, and that, therefore, acting on the mobility reorganization becomes a basic issue for upgrading.

The constant increase of private vehicle traffic and its invasive character not only worsen the livability of the urban environment, but contribute also to a decrease in the share of non motorized transport modes. The rebalancing of mobility in favour of these transport modes, and in particular of walking, has to start off a process of reappropriation of the intermediate spaces, that impresses on the structure of the mobility system: components, weights and hierarchies.

The aim of the research is to find out strategies, tools and techniques to regain these spaces to pedestrians, and to re-design them so to offer the required specific urban quality. This attitude is due to the belief that this process of upgrading allows to set up again the real essence of the city, and as consequence promotes pedestrian mobility.

STATE OF THE ART

The improvement of the quality of life for pedestrians has been taken into consideration, in theory and in practice, in most of the European Countries with the aim to promote pedestrian mobility; in Italy this issue is not so rooted yet, however it seems that something is starting to change.

The policies and strategies chosen at national, and sometimes also at local sphere, have targeted the reduction of air pollution levels due to the use of the car, and not the promotion of pedestrian mobility. Up to now they have not succeeded in reducing the traffic volume, but only in diverting it from the core of the cities to the outskirts, from the cars to the mopeds and motorcycles. The campaign of the Ministry of the Environment is directed to underline the risk of respiratory illnesses, consequent to environmental pollution, and to reduce it; people are very sensible when their health is involved, so it is a good appeal; but it doesn’t work in the same way for cardiovascular diseases due to a sedentary life, or at least it is of no use for increasing the share of walking.

Thanks to this campaign, many towns in Italy have joined the “Car free cities” network and many towns are joining the “A day without my car” program; however it has to be noticed that these are sporadic measures aimed only at awakening people to these issues. Moreover,
in general, only the centres of the towns are involved, but it seems that something is slowly changing; this year in Rome, also many squares outside the town centre have been closed to vehicular mobility.

The lack of involvement shows very clearly when looking for data on pedestrian mobility; they cannot be compared with the ones existing in Europe, both for the trips made on foot and for the ancillary walking; the last report from ISTAT on various aspects of everyday life gives useful indications, but absolutely not sufficient to define in any way the behavioural motivations, or the aptitudes in using the urban space, that could induce the users to choose walking as an alternative mode of transport.

What above stated doesn’t mean that there are not spaces devoted to pedestrians; since many years ago, in Italian cities, in particular in the oldest and most prestigious areas, many interventions aimed at the total exclusion of the vehicle traffic and at the creation of “pedestrian islands” have been realized. The reason why lies above all in the protection of the monuments and of the so called historical centres from the decay induced by air pollution; therefore the pedestrian islands were located only in peculiar valuable parts of the city. This solution has reintroduced during the years, a new type of zoning, devastating the continuous character of the city, and boosting the caesura between the old parts and the newer ones.

International researches and experiences take to say that this is not the only way to make a pedestrian friendly city. This research indeed doesn’t follow it up, but refers to a more comprehensive prescriptive concept, the “Environmental Island”, applying the types of intervention it foresees or it adumbrates, widening in this case their purport.

THE LEGISLATIVE FRAMEWORK
The Urban Traffic Plan and the Environmental Island

Mobility Plans and Urban Traffic Plans are the most important instruments for mobility management in Italy; the prescriptions for drawing them up are in step with the relevant european positions on the subject. The most innovative aspects, as for the matter in hand, regard the consideration of “pedestrians as a priority component” in all traffic matters, and the establishment of the “Environmental Island”, as cluster of micro urban environments with pedestrian priority, practicable in mainly residential urban areas, surrounded by main roads, where local roads may be aimed at satisfying pedestrians and parking needs, and where “environmental” features are meant to improve the urban spaces’ livability, with particular attention to their safety and accessibility, for all the most vulnerable users.

This “Environmental Island”, mentioning the “pedestrian network continuity”, allows to consider pedestrians as the core of the mobility planning, to reduce private vehicles circulation, and thence to control car speed levels by different devices, and so to give pedestrians a wider part of walking areas, dimensioned and equipped in a suitable way.

The environmental islands, unlike the pedestrian islands, allow to maintain the urban continuity; they indeed can be ruled and structured in their hinterland to allow the coexistence of different types of mobility, motorized and non motorized, with various interdependent weights; this approach brings to a pedestrian network dotted by pedestrians areas, mixed together with, and supported by, a calmed vehicular mobility.

It is worth to underline that such prescriptive instrument, characterized by an up-to-date layout, wished also in other European Countries, has not been implemented in a widespread way, perhaps because its innovative issue has not been caught yet, or perhaps because it is not supported by consistent technical regulations apt to start the implementation process.
In this research, it has seemed hence very appropriate to deepen the “Environmental island” concept, to individuate which are its problems, limits and potentialities, and to give some indications for its implementation.

THE ROAD SAFETY NATIONAL PLAN AND THE PILOT PROJECTS

Speaking in particular of safety, it has to be said that while in most of the european Countries great importance has been given to the vulnerable road users safety, adopting national safety programs and funding researches, campaigns and implementations, in Italy the drawing up of a National Plan for Road Safety, has been promoted by the Ministry of Public Works only very recently. The main objectives have been included in a law, general indications and applicative guidelines for the Road Safety National Plan have been approved by a decree; these deeds take care of infrastructure design and traffic control, but the most interesting feature is that they finally point out that many safety problems lie in the urban areas and with the most vulnerable categories. Having fixed these points, the main efforts are aimed at creating protected ways for pedestrians and at decreasing car speed levels in urban areas, using also traffic calming measures in the roads re-design.

A State Commission has examined about 200 Pilot Projects, that have been elaborated by technicians and experts for Town Municipalities and Provinces, from all over the Country, in answer to a national competition issued by the Ministry of Public Works; the aim has been to award with a co-funding, according to what set by these deeds, the best ones, so to have them realized and monitored in the next months. This procedure is meant to establish a best practice and a data base, but there is also a hope that it will start to form a greater common conscience on this topic.

THE UNIVERSITY ACTIVITIES

The group working in the Department of Design and Sciences of Architecture of the University of Roma Tre, with the coordination of prof.Martincigh, has run studies and researches on these topics. It has been involved in a Faculty research: “Urban rehabilitation and pedestrian mobility” coordinated in the COST Action C6: “Town and infrastructure planning for safety and urban quality for pedestrians”; is starting now a Faculty research: “Enviromental comfort of intermediate spaces: the function of green structure”, coordinated in the COST Action C11: “Greenstructure and urban planning”; it has organized a “Center for research and consultancy, for information and training on: Urban quality and sustainable mobility” funded by University Roma Tre; it makes consulting activities for some Municipalities and training activities for specialization courses on these issues; it has been involved in two EC funded research: “PROMISING - Promoting safety measures for vulnerable road users”, in the part dealing with the infrastructure measures, and actually in “PROMPT - New means to promote pedestrian traffic in cities”.

In running these basic and applied researches, the attention has been focused on the aspects related to the planning and design process, to the definition of analytical, operative and control design methodologies, centred on the users requirements/performances meeting, and to the individuation of the possibilities and limits of application of the traffic calming concepts and measures. These aspects have been checked in feasibility studies and experimental applications for the upgrading of modern residential districts by the promotion of pedestrian mobility.

At present the group is closing a national funded research that involves two other universities: the University of Rome “La Sapienza”, Faculty of Engineering, and the University of Florence, Faculty of Architecture, and different domains: road structure,
urbanism and technology of architecture; the first results about the definition and design of the “Environmental Island”, that have been reached in the part of the research that is run by our group, “Sustainable mobility and urban upgrading: innovative tools for traffic control, for road design and for collective spaces organization” are here presented.

THE RESEARCH METHODOLOGY

The intervention program

The streets of modern residential districts are planned above all in order to meet the vehicular mobility exigencies, and so their design is very dull; the dimension of the spaces devoted to pedestrians is so reduced and poor that makes them uncomfortable; the arrogant invasion of motorized modes make them unsafe and often not accessible. The quality of the outdoor spaces is very low because they do not offer anymore possibilities of mobility, of exchange and social relationship to the dwellers/pedestrians, and because they do not present aesthetics and environmental values; these aspects were both characteristic of the old towns, where the prime function of the urban intermediate spaces was to house people’s religious, political, commercial and social activities.

To rehabilitate such areas, it is clear by now that the individual motor traffic must be reduced and controlled, and that the pedestrian mobility system, equipped with intermodal exchange points, must become the connective and the support for some city functions; the “places” for meeting and for other urban life activities, so to promote again social and cultural relations. To such end, the continuity between public squares and streets, widenings and gardens, and any ground floor space, has to be created, to effect new pedestrian routes creating a linking network between services and dwellings, alternating places where to walk to places where to stay.

To reach these goals, in the research, a holistic approach and an integrated design that uses various technical and townscape devices had been adopted.

PEOPLE’ EXPECTATIONS AND ENVIRONMENT’S PROPOSITIONS

In these urban spaces, to recreate not only acceptable, but also attractive, use conditions, for all the most vulnerable users, it is important to understand, on the one hand, who are the pedestrians and what they expect from the urban settings in which they perform the main activity of walking and all those associated with it; on the other one, to define which are the features of the urban environment that are considered more “significative” and valuable by pedestrians, and that are able to pursue an appeal; the whole to succeed in understanding what they mean for urban quality.

When speaking of urban quality then, it is necessary to deal contemporarily with two different aspects, on one side with the people’s expectations and cultural habits, and on the other one with the urban environment’s propositions; the more these two aspects meet, the higher level of overall quality is reached.

Since the quality of the urban environment depends on a complex interlacing of spatial, functional, social and cultural aspects, it changes, time by time, and thence it has to be defined case by case; but the methodology to be used for this aim can be settled.

THE PHASES OF THE DESIGN PROCESS

In the research it has been applied a specific design methodology already defined and experimented by our group; this design methodology is articulated in three different parts, each one characterized by various phases.
The first part is dedicated to the analytical aspects, run in three phases: the analyses of receptivity, of desirability and of opportunity. Since in the preliminary design, it is basic to consider the individual’s own decision making process about the walking choice, that is mainly influenced by the space configuration and features, in the first two phases the needs of the people, that foreshadow the “demand”, and the form of the spaces and their performances, that forshadow the “offer”, are analyzed. In the third phase all restrictions and obstacles to the transformation possibility are analyzed, depending on their nature: legislative, technical, cultural and so on.

The second part of the methodology is dedicated to the evaluation of the compatibility, that is run at different levels; at the first level, the interface between the “demand” and the “offer”, and the study of their congruity level, indicates which are the best possible uses for the spaces at disposal, and which adjustment interventions are needed, at the various scales, to make them suitable at the most; at the second level, the comparison between the equivalent alternative technical solutions, suited to accomplish the required interventions, and the configuration/construction of the urban spaces, by the study of their congruity level, leads to the choice of the technical solutions to be implemented. This phase of the process is the core of the feasibility study, since it defines what to do and how to do it.

The third part of the process is dedicated to the design of the selected technical solutions.

THE REQUIREMENTS/PERFORMANCES MEETING

In the research work, all the parts of the methodology have been run. For the first phase of the first part, the techniques used by Kevin Lynch\textsuperscript{11} to read the city, the comprehension of the “genius loci” as described by Christian Norberg Schulz, the characterization of the gathering places, the piazze, and their role depicted by Camillo Sitte have been of great help\textsuperscript{12}; for the second phase, the studies on pedestrians’ problems and needs run by Olof Gunnarsson, and the ones on people’s behaviours and habits run by Jan Gehl, have been very interesting and valuable\textsuperscript{13}; for both, the systematization made by Christofer Alexander\textsuperscript{14} has been basic.

Since in the design process “urban quality” is meant as the capability of the environment configuration of meeting, in quantitative and qualitative terms, all the material and immaterial requirements of the users, by giving the required performances, one of the aims of the research has been the systematization of the requirement classes. In this note it seems worth to deepen this part of the desirability analysis because, while the approach to it is well known, its transposition to the specific field, related to the urban level, the rehabilitation design and the pedestrian mobility, is quite new.

The codification of the most important requirement classes, that model the performance demand that the specific spaces must offer, has been made based on a study at theoretical level, reviewed, deepened or widened, thanks also to some field research.

It is worth to make at once some preliminary remarks about one basic requirement: accessibility, that needs a special attention in promoting walking as an alternative transport mode. Accessibility is considered, taking also into account the Italian national legislation’s many innovative aspects\textsuperscript{15}, as a basic element of urban public outdoor spaces, as a prerequisite; thence accessibility must be considered as innate in the definition of the urban space itself, and therefore not singled out the design culture, which makes that the adjustment interventions aimed at satisfying all the other requirements have to be automatically defined also at making spaces accessible. Accessibility is meant as the full reachability and usability of the places, of the services, facilities and equipments, including modal interchange points.
Safety has to be meant as safety of use and thence not only as safeguard from dangers related to traffic, but also from those inherent the use of the related pedestrian space itself, and as security, meant as safeguard from unexpected events; as every other exigence, it must be considered in its physical and psychological aspects.

Comfort has to be meant as physical wellbeing in relation with the climatic factors and meso-climatic conditions, due to the elements that constitute the urban environment and to the factors that can prove the senses (buildings, green, water, type of mobility, of spaces and of uses, related consequences and so on); but also as wellbeing in relation to the psychological aspects; and finally as commodity, of movement and rest, for the various possible uses of the urban space. The parameters inherent comfort are connected to subjective evaluations and to cultural expectations, so they are more difficult to be investigated and defined.

Use, in the case of the outdoor public spaces, needs to be defined more precisely depending on the specific case; for the particular matter in hand, walking, in all its forms, is considered the main activity to be performed in the intermediate public spaces, but it is considered accompanied by many other back up activities: of rest, relationship, exchange, leisure and so on. Each activity induces specific requirements, that are inside these classes, and that have to be technically translated in requisites.

Look concerns, namely, the "appearance" of the intermediate spaces, of their overall and peculiar characteristics, in a few words of their "physiognomy"; the variables contributing to its definition though are not only the real elements that constitute the structure and form the townscape, but also the abstract elements that characterize it, as: the distinctiveness of the "place", the permanence in the "place" of values coming from traditions, its capability of sending messages, of reminding archetypes, of answering to the various exigencies that are bound to culture, society, behavior, psychology, as for example the need of: socialization and bearing, identity and belonging, orientation and scale, "place" and "memory", language. So it concerns not only the expectations that the pedestrians have about the aesthetics values but also, and above all, the comprehension of how they perceive the environment that they use and that surrounds them.

The perceptive fruition indeed is what characterizes, in particular, this requirement class, that results the most peculiar and unsettled.

Management is a very important aspect of the urban quality of the outdoor spaces devoted to pedestrians; it is evident how the problems of management, upkeep and maintenance can diminish and even destroy completely any level of quality if not thought of, not only after the implementation but already at the design phase.

Integrability of all the elements that constitute the urban outdoor environment; every component implies a high degree of interrelation, either as interface or as interference, with the other components that are involved in the process of reaching urban quality. The complexity level of the problem and the wide field of the operativity, characterizing the approach aimed at improving the urban quality of the intermediate spaces on its whole, lead to consider the need of an integrated design process.

Environment safeguard is a requirement that, in the outdoor urban spaces quality, has two faces; in fact it is together a background of the research, and at the same time the goal to fulfill since, once reached the urban quality, the improvement of walking as a transport mode will bring with itself also a better environment safeguard.

Since most of the pedestrian exigencies are characterized, more or less, by some psychological aspects, in the study of the ones which are more tied to mind elaborations, it is
worth to integrate the current design indexes, objectively measurable, with other tools, apt to consider those features and ways of pleasing that are more difficult to quantify: the “quality indicators” for pedestrians.

This requirement codification is an operative one; indeed it is not only a way to analyze the situation, but it constitutes also a resolving and control tool; it can be used at the end of the design process as a check list, or at the beginning as a guide.

**A SETTING FOR PEDESTRIANS**

By now it is clear that to make an area pedestrian friendly doesn’t mean to put “no entry” traffic signs or travertine kerbstones that are unavoidable elements as signals and deterrents, very clear for what concerns their meaning of prohibition to the circulation of vehicles, but absolutely not sufficient to denote a new kind of urban space. This, indeed, cannot be originated only by prohibitions, but from significative elements able to promote consensus and from the new meaning of “pedestrian space”.

To validate this thesis, it is sufficient to reflect upon the matter that pedestrianization is successful, and is positively evaluated, when it is implemented in historical centres or in meaningful places, where only basic interventions are needed, being such spaces already born and structured under a pedestrian point of view; and that it is not successful when implemented in outskirts residential areas.

Investigating the factors that differentiate the two situations, it is possible to start individuating some elements that must be recreated so to make interventions really useful for upgrading decayed, or below the quality of life current expectations, modern environments. It is not a matter of urban furniture only; benches, flowers boxes, lamps and so on are important but only if in accordance with other factors; it is necessary indeed to recreate the events variety that characterizes “centres”, a mixture of uses and a mixture of users; the spatial episodes alternation that can host various functions; the landmarks, perspectives and views that characterize the “place”.

**THE PROPOSAL FOR “PIAZZA VERBANO”**

*The analytical phase*

The first year of research has been devoted to the theoretical aspects and to the elaboration of the methodological and technical tools to be used in the applicative phase; in the second year, to simulate an upgrading process based on the “Environmental Island” and the integrated planning approach a residential district in Rome, built during the 20’s – 60’s period, has been chosen as case study: Piazza Verbano. Thanks to the II District Municipality interest and participation, it has been possible to run the receptivity and the desirability analysis in a concrete way. Moreover the design of the mobility reorganization has allowed to overlook the possibilities presented by the different European Countries existing rules and the related innovative techniques application, about traffic calming and pedestrian areas, and therefore, checking sectorial Italian prescriptions, to make reviewed proposals.

The first step has been the study of the pedestrian users; in the district the elderly can be chosen as elective users, not only because of their frailty, but also for their large consistency and moreover, for their being “optimal” users of all the area outdoor spaces, since they spend there a lot of the spare time they have at disposal. Main classes of exigencies have been investigated to determine the main requirements: Safety, Security, Accessibility and Comfort; focusing on the meeting of these requirements as expressed by aging people,
analyses have been run on the spot, with questionnaire and interviews, to enhance the real aspects of their mobility and lifestyle; these results have then been checked with the opinions of other categories of pedestrians, though it is known that designing urban spaces for the elderly, or for the disabled people, usually mean to achieve more livable conditions for all the dwellers.

Several investigations, questionnaires and interviews, have been run to individuate main destinations, meant as everyday poles of attraction, their related distances and the most usual paths; through them, the black points and the traffic dangers they have commonly to face, for what concerns safety, have been determined; also other complaints have come out for narrow and uneven walkways or for unsuitable lighting, that, besides affecting negatively safety, have also no positive consequences on accessibility, security and comfort issues.

In running the survey and the investigations we have found less participation by the people than what we thought; this could be due to the not sharing of this new cultural value, that has not ripen yet, as already said, or to the mistrust in the possibility that really something will be made, or to the feeling that their contribution has no use.

These first results have been checked with literature, with the theoretical requirement classes codification and with data survey. Contemporarily, the study of the intermediate spaces has been made to survey, on the one hand, the urban environment constitutive elements, meant as fruitful neighborhood, and on the other hand the infrastructure, meant as a whole: carriageway and walkway. The lacks and potentialities, the poles of attraction and the facilities have been stressed. The vehicular mobility, has been analyzed in quantitative and qualitative terms, its repercussions on the safety levels and on the environmental quality have been underlined. To express an evaluation on the quality of the configuration, and on the phisical and psychological appropriateness, of the pedestrian dedicated spaces, it has been very important to consider with particular attention the aspects related to the microclimate.

The area is characterized by the presence of some green structures: two parks, trees along the streets and in a roundabout, and some green courtyards; the sunshine and the shading has been simulated to understand which are the best and worst spaces to be used in winter and in summer by pedestrians.

The design phase

A first consideration has to be made; the district cannot become a single environmental area. The classification of the main axis and the presence on it of public transport, its actual interdistrict role and the traffic level do not allow to revise its classification as a local road; this is in contrast with the role it plays in the neighborhood; it is indeed the main path that leads to all the surveyed main poles: the market, the park, the school, the church, the square, the movie theater, the post office and the bus stops. Consequently it is where the most of the pedestrian traffic flow is condensed, but also where there is a high number of accidents and a high level of pollution: noise and air. The research group intends to deepen this argument, to highlight the limits of application of the prescriptive definition of the Environmental Island, at least in some existing urban situations, though they represent residential environments.

In the design then, the main axis acts as the backbone of the residential district, that becomes a 30 Km zone; the main problem is then to connect the bordering areas in a safe way, so to constitute a real pedestrian network where it is needed.

The location of the interventions and the solutions have been defined to satisfy the emerged exigencies; the requirement codification illustrated ahead has been one of the tools used to individuate, analyse and propose alternative technical measures, and, finally, to select the ones to be implemented; another tool came out of the receptivity analysis and allowed to
evaluate the compatibility of the modalities of transformation with the configuration/construction of the urban spaces; both had the aim to grant the suitableness of the solutions, having in mind the quality control on its whole, both from the users’ point of view and from the urban environment’s one. The choice of the technical solutions has been an important step of the process, because it can lead to different level of urban quality.

The proposal is aimed at reshaping the intermediate public urban spaces and at characterizing it by settings at pedestrian size; in designing them, the attempt has been to create also an involving townscape. In the re-design of the vehicular infrastructure, and of the paths and areas with pedestrian priority, have been used innovative measures aimed at calming the traffic and at improving the safety for pedestrians (narrowed carriageways and chicanes, raised junctions and crossings, gates and signs); these measures have been studied, together with other elements, so to create a continuous pedestrian network that, offering besides the basic performances of accessibility and safety, also some added values, as a better comfort and appeal, a good identity and belonging feeling, is able to foster not only walking but also other activities as meeting and resting, or to spark off events enthralling for people. To obtain this, the spaces have been designed with a variety of forms and elements that are appreciated according to the pedestrian scale and speed; lighting too has an important role, both for improving safety and for enhancing the worth of the districts: green and architecture.

Once spotted the most used paths and the most recurring problems, it has been made a pilot project that re-designs, at first, the main axis of the district, as a test to validate various solutions and some technical measures.

The three most important interventions are represented by a “doughnut square”, a church square and a raised junction in front of a park.

The “doughnut” square has been created where there was a roundabout junction: the roundabout has remained, but has been reduced, as the carriageway that surrounds it; the aim has been to decrease the speed, to let no people reach the inner green area and to regain, on the external ring, more space to host various activities. These spaces have been characterized in different ways depending on the facilities already existing or on the people desires: a street café, a newspaper stand, a cinema front yard, a space where to sit and meet, an equipped taxi stop; the roundabout centre has become an urban sign, well visible from a distance, by day and by night, thanks to the sensational lighting of the trees. The space dimension has allowed to build a roundabout that is safe for pedestrians, with centrifugal raised crossings that make the external ring continuous.
pedestrians and bicyclists