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Pedestrian Planning in City Centers: a Study of Guimarães and Braga

Pianificazione della pedonalità nei centri urbani: uno studio su Guimarães and Braga

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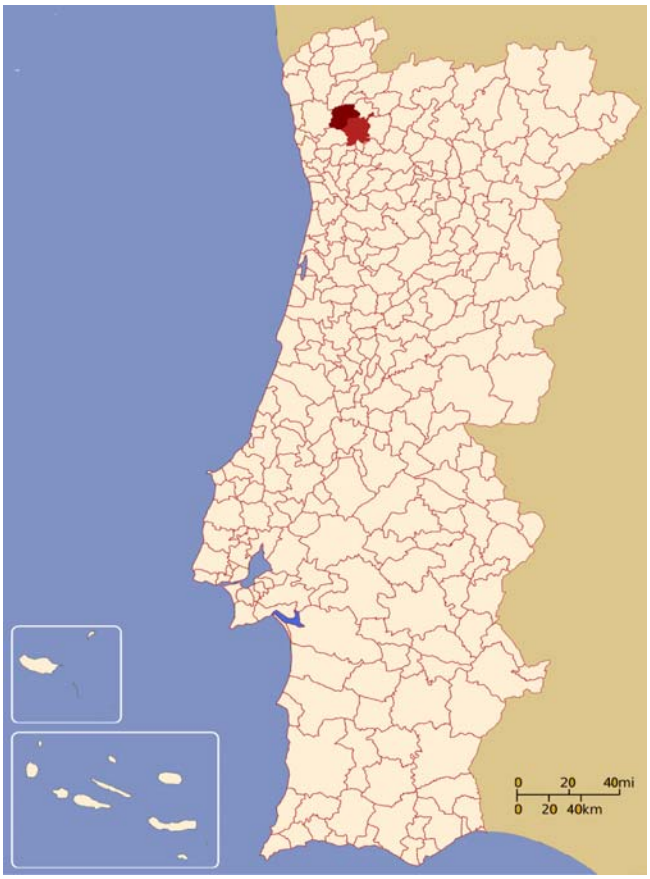
People are walking in cities for different reasons. Some walkers walk for going to work, some are walking for shopping and some are for leisure during day and night hours. Medium sized cities like Braga and Guimarães in Portugal are depending on car for even shorter trips up to 2 kilometers. However, the walkways are allowing people to walk in convenient and safe way including late night environment.
The pedestrians feel troublesome to walk on the footpaths because of illegal parking and discontinuation of walkways. Municipality transport plans and master plans do not incorporate pedestrians as a major component.
But this egress mode of transportation is very important in medium sized city centers like Guimarães and Braga for the people to enjoy city centers' activities.
This paper focuses on the types of walkers who use the walkways on a regular basis. Usually, people are feeling comfortable to walk when they go to clubs and bars in a group in these small cities especially after work. This paper again tries to focus the varieties of problems on walkways and to present policies that can improve the situation. Municipal master plan and transportation plan have been studied carefully to see the provisions of pedestrian planning options.
Field surveys have been conducted both in form of questionnaire and observation during the end of 2009 and results show different patterns of pedestrian behavior as well as evidence that people get different experiences with problems while walking on the walkways in both surveyed towns. Considering the issues of sustainable mobility, this paper also tries to suggest policies to motivate more people to walk especially in the medium-sized cities of Portugal.
Four major factors have been assessed to know the existing problems of sidewalks and walkways in the studied cities. Those are: functional problems related to the physical attributes of the street and path; safety, that reflects the need to provide safe physical environments for people; aesthetic, that includes the cleanliness, street maintenance and architectural propositions of the walkways in the existing set up; destination that relates to the availability of local facilities and connection of the walkways with different urban services.
Representations of safer and convenient city walkways thus encourage more people to walk for shorter trips which certainly leads to healthy and carbon neutral city. This study is an attempt to propose a methodology for quick assessment of walking environment problems in medium-sized cities. More empirical research is in demand to further develop this methodology.
The importance of this approach is that less time is needed to apprehend the problems, to list and classify them. Likewise, more time can be devoted to problem discussion and finding of solutions within a public participatory atmosphere.

Pedestrians Mobility and Planning

Walking is the oldest and most basic form of human transportation. It requires no fare, no fuel, no license, and no registration (Portland 1998). With the exception of devices to enhance the mobility of the disabled, walking demands no special equipment. Thus, walking is the most affordable and accessible mode (Rahaman 2006). Innovations in planning for pedestrians have occurred largely in response to environmental pressures. In the first half of the nineteenth century, the arcade offered protection from wheeled traffic as well as a clean, dry surface for walking when European streets were poorly drained, even treacherous (Zacharias 2001). In Portugal, the two largest cities, Lisbon and Porto, experienced successful revitalization attempts of their riverfronts and city centres during the second half of the 1990s with special programs of widening the sidewalks to encourage more pedestrian activities (Carlos 2007). However, medium – sized cities like Braga and Guimarães are yet to be studied for Pedestrianization and problems of walkers. This paper tries to highlight the problems of pedestrians on walkways in those two cities and to bring forward policies that may offer walkers a smooth and comfortable sidewalk environment.

Although pedestrians have been valued for their contribution to urban vitality, walking has not, until recently, been considered a serious component of the modern transportation system. Walking is clean, easy on the infrastructure, healthy for the individual and integral to community livability. Considering these positive aspects of walking, several major municipalities around the world like: Portland, Seattle, Vancouver and Tokyo have developed their pedestrian master plans to be implemented for a safer and convenient walkways. Medium sized city centers like Braga and Guimarães has the master plan that highly incorporates landuse plan and transportation plan. But the



Braga and Guimarães are two neighbouring northern municipalities in Portugal have with almost 250,000 inhabitants. City centers of Braga and Guimaraes are dedicated to pedestrians only

pedestrian plans are important to offer a liveable city center for people who are coming for shopping, leisure or for meeting others.

In general, the pedestrian master plan includes five basic elements.

Pedestrian transportation policies should be adopted in the first stage to attract more walkers on street. Then classification of streets can offer different types of width, length and design considerations of walkways. Pedestrian master plans have been formulated in most of the European (London, Barcelona, and Stockholm) and North American cities (Seattle, Portland, and Toronto) in the past. Most of the plans are emphasized on the contexts of: safety, accessibility, connectivity, public health, streetscape and landuse (Seattle Pedestrian Master Plan 2007). Pedestrian master plans are prepared following a series of scientific approaches in European and American cities. Typical survey methods are carried out in form of interview, questionnaires, pedestrian behaviours and stakeholder analysis (Florida department of transportation 1997). In this research, the similar approach has been carried out to know the problems of pedestrians on walkways in city centers. Shopkeepers at the adjacent areas have been surveyed as a major stakeholder to know the perceptions of walkways. In the studied municipalities, pedestrian transportation policies are yet to be introduced in any form of plans. However, within the municipality transportation planning documents, roads have been classified as major and minor roads. Walkways have been placed in the city centers with 1.5 to 3 meter width in each side of the roads.

Besides, medium sized cities like Braga and Guimarães have long history for socialization in the city centers. Weather in these cities are good during the summer time and lots of events like fireworks, concerts and other entertainment activities are taking place in these two city centers. The city centers are also well connected with the adjacent railway station within 2 kilometres to attract more people from outside the city skirts.

At night, many people are coming to the city center to take dinner in the restaurants. It has also been observed from the field survey that the young people are coming to the city centers at night in a group of 4 to 8 people. They can not fit in a single car and for this they walk for almost a kilometre to go into the city center. Street lights are very good to offer them a nice walking environment but the problems mentioned earlier remain same. Older people are coming to the city center in the afternoon to meet friends and relatives usually and spend time in the city centers for

about 1 to 2 hours. For this, smooth walkway environment is important for all age group of people so that they can enjoy their time in the city center. The municipality should realize this matter to offer their best efforts for a smooth and enjoyable walkway environment in the city centers in Braga and Guimarães.

There are three specific objectives of this study which are as follows:

a) To explore the reasons of walking in the study areas and to understand the importance of pedestrian plans in medium sized cities like Guimarães and Braga;
b) To understand the major problems while walking in the city centers;
c) To recommend measures to offer comfortable walking in the studied cities for future pedestrian planning options.

Study Area

Braga and Guimarães, two neighbouring northern municipalities in Portugal have almost 250,000 inhabitants (according to the Portuguese Statistics 2009). The city centers of the heads of the municipalities have been considered as the study area for this study. Situated in the heart of Minho, Braga finds itself in a region of contrasts between the East and the West, from mountains, forests and fields to the great valleys, plains and fresh and green meadows. The town of Braga with 100.000 inhabitants dominates its municipality with a total resident population of 164 192 inhabitants and with an area of 184 sqkm. (Braga Municipality 2010). Administratively, Braga is the capital of the district consisting of 14 municipalities including also Guimarães. In brief, Braga is an urban municipality and its head has long been in the top 5 most populated towns in Portugal.

Braga and Guimarães are the two most important towns of the recently defined Quadrilateral. The Quadrilateral consists of four cities named as Braga, Guimarães, Barcelos and Famalicão. These four cities have formed the Quadrilateral as an attempt to resist the metropolitanization of their territories by Porto city. The valley areas are predominant, but they don't reach high altitudes, varying from 20m to approximately to 570 meters, so that the sun exposure is, in general, good throughout most of the territory.

Guimarães is another northern city of Portugal that has a very rich cultural heritage. It will be European Capital of Culture in 2012. The municipality has a land area consisting almost 241 sq. km with 161,000 inhabitants (Guimarães Municipality 2010). But its head consists of 40.000 inhabitants. Over many years, Guimarães city officials pursued a policy of preserving architectural forms and rededicating spaces to new functions so that old and forgotten areas of the city center were given a rebirth. Guimarães is the focus of greater levels of interest and recognition, both nationally as the first capital of Portugal and internationally, as a result of the city's strong commitment to the criteria it adopted and craftsmanship it supported in this area.

The last thirty years have testified the accomplishment of some old projects and ambitions. The renovation of public spaces and of municipal buildings, dedicating them to new functions and services, along with the technical and financial support for private initiatives, represent the three main strategies that have helped in achieving the prime goals for the Historic City Centre of Guimarães. Those goals were basically:

– First, the renovation of the landmarks in the Historic City Centre strove for the highest level of authenticity by using traditional materials and techniques, an ideal which not only maintained the architectural integrity but also respected the quality of form and function.
– Second, the number and type of residents living in the Historic City Centre should be maintained the living conditions of this population improved and gentrification was not welcomed.

Both municipalities of Braga and Guimarães have an urban planning department that is taking care of execution, implementation, strategies and further urban planning scenarios in the city jurisdiction. But the Municipality of Guimarães has had, since late seventies, a specific department dealing with the city centre. It has been recently incorporated in the urban planning department. Pedestrianization plans and strategies are being taken care of by the municipalities too. Both Guimarães and Braga municipality has its master plan that consisting of transportation plan, detail area plan and structure plan up to 2012. Guimarães city will be the European capital of Culture in 2012 and remaining this in hand, the city is preparing city center beautification plan. This includes city center revitalization and connecting the major tourist attractions by walkways.

Braga city center has a very nice walkway connecting with major tourist attractions. But in case of each city, there are no separate pedestrian plans which they are now considering to prepare along with the municipality transport plan. The plans will be revised from 2011 for a 2 years time period. Both long term and short term plans will be initiated to implement the needs accordingly. City centre areas of both Braga and Guimarães have been surveyed to collect information related to the pedestrian flows, problems of walkers as well as some short interviews of local residents. The streets in city centre areas have been considered for survey and questions.

According to the municipality plans of Braga and Guimarães, the engineering departments are responsible for building

These two cities are quite walking friendly in nature. However, due to physical constraints of the cities, sometimes it is rather difficult to walk.

and maintenance of the sidewalks in city centres. The funds are coming from the central and local government for any improvement of sidewalks in the city centres in Braga and Guimarães.

These two cities are quite walking friendly in nature. However, due to physical constraints of the cities, sometimes it is rather difficult to walk. Lots of tourists are coming every year in both the cities and exploring the city by walking.

Methodology

Simple method has been applied to collect and analyze data. Questionnaire surveys have been conducted to get the information related to reasons for walking, problems of walkways and other socio-economic data. Observation survey has been carried out at different times of the day and night to count the number of walkers and to know the pedestrian speed of walkers in both the studied cities. Photographs of walkways from both cities have also been analyzed to know the problems of the pedestrians.

After collecting the necessary information, simple statistical methods have been applied to summarize data to present the major findings of the study. Sample survey has been conducted in form of questionnaire to interview 100 people in Braga and Guimarães. Observation survey have been carried out in form of counting the pedestrian flow, considering pedestrian speed, elevation of the walkways, pedestrian signs and bill boards etc. Conceptual frameworks of problem identifications have been reviewed from literatures to know the typologies of problems in these two cities.

Four major factors have been assessed to know the existing problems of sidewalks and walkways in the studied cities. Those are:

Pedestrianization plans and strategies are being taken care of by the municipalities too. Both Guimarães and Braga municipality has its master plan that consisting of transportation plan, detail area plan and structure plan up to 2012.

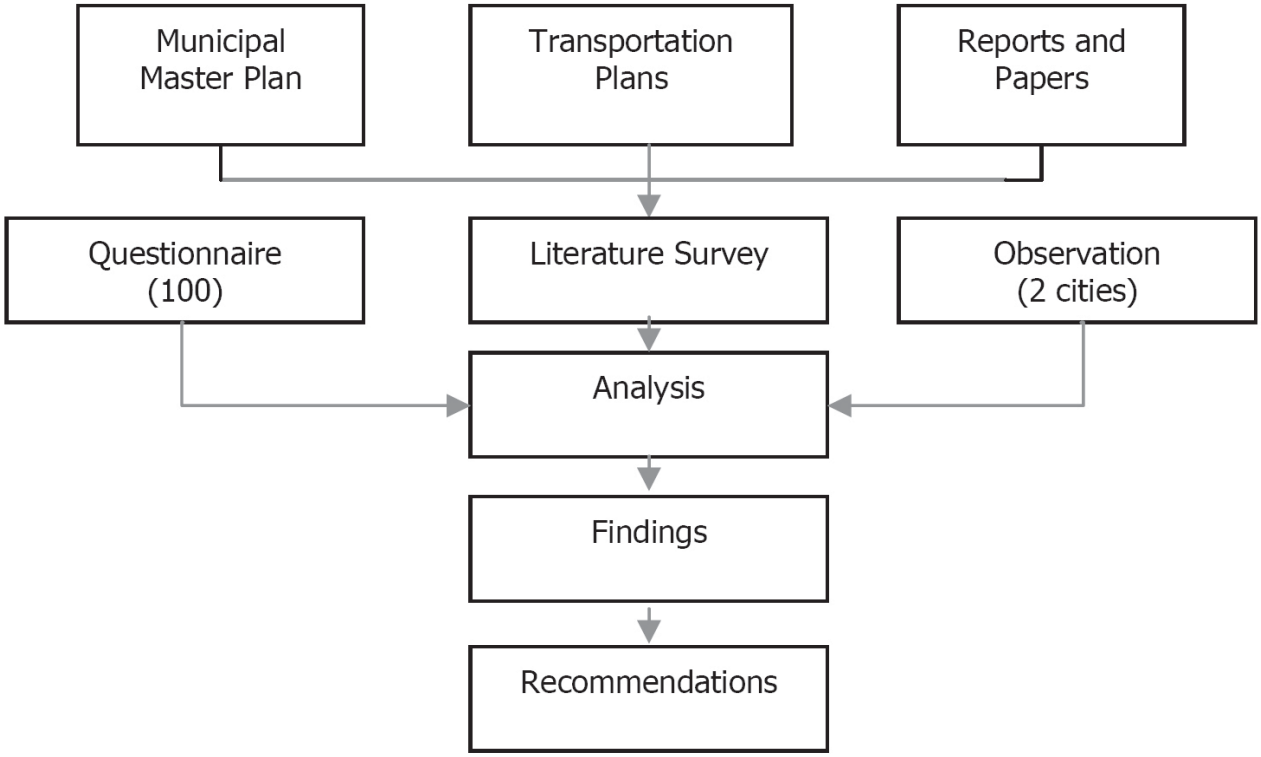
a) Functional Problems: in this framework relates to the physical attributes of the street and path.
b) Safety: reflects the need to provide safe physical environments for people
c) Aesthetic: includes the cleanliness, street maintenance and architectural propositions of the walkways in the existing set up.
d) Destination: relates to the availability of local facilities and connection of the walkways with different urban services.

These classified problems have been explored in two cities in Portugal through field survey. Municipality master plans and transportation plans have been reviewed carefully to know if there is any special kind of pedestrian plans to ensure the pedestrian mobility in urban planning. Most of the time, it has been experienced that the pedestrian plans have not been included into the formal transportation plans. But the engineering department of the municipalities takes care of building walkways as a basic component of road construction in the city centers.

Who are the Walkers in Braga and Guimarães?

Recent guidelines for physical activity recommend that adults accumulate, on most days, 30 minutes or more of moderate-intensity physical activity (such as brisk walking), in minimum bouts of around 10 minutes (Pikora et. al. 2003). Transport research unit of Oxford University has unveiled information (2005) that in Portugal, 49.9% of the families have at least a car.

During the last couple of years, the car ownership in Portuguese cities grew even faster and has been predicted that at least 68% family has a car in 2008 (Dargay 2005). This means people are depending heavily on car even for a short trip. However, Braga and Guimarães city centres are



Simple method has been applied to collect and analyze data. Questionnaire surveys have been conducted to get the information related to reasons for walking, problems of walkways and other socio-economic data.

very well designed for the walkers so that people can shop and can walk for leisure. For instance, different walkers in terms of age can be seen on the city centre streets of Braga and Guimarães.

It can be seen that young adults (age group 15 to 40) are walking more at night during 20 to 2 PM in Braga. The situation is very similar in Guimarães though significant number of youths walks in the same time period. Indeed, the young adults are going to bars or clubs during this time and they rely on foot to go to those facilities. It has also been noticed that elderly people (65 or more age group) are walking during the day time from morning to late afternoon for shopping, leisure and other matters.

Table 3 and 4 show different walkers based on their occupation. It has been observed that the retired persons are walking mostly in the morning for recreation, leisure or for entertainment.

However, retired persons do not feel that much comfortable to walk during night or even in the late afternoon. Students and unemployed people are walking more during the late evening and night. Indeed, these people are walking in a group of 5 to 10 persons to go to bars and pubs. Professionals like engineers, teachers, administrators, etc. are walking for shorter trips up to 15 minutes from home or workplace to go for shopping or bringing their children back home from schools. The professionals are walking more during the evening time. Late at night, only some students and unemployed persons can be seen on the walkways and especially in the weekend. Those walkers walk back home from the bars or nearest restaurants to their house. Apart from these general observations that apply in both towns, some differences can be depicted.

The city center of Guimarães concentrates in relative terms more bars and restaurants than Braga's. Being the town of Guimarães smaller in size and having a smaller city center, it is closer to nearby areas. This may be the most important reason why significant numbers of students and professionals concentrate in the city center.

An additional reason might be the special atmosphere that Guimarães medieval open air city center offers to the high number of users at night. This strong intensity of walkers shows clear evidence in the survey results.

There is very high intensity of pedestrian flows late at night (20.00 to 02.00 hours) in comparison to Braga where the pedestrian flows do not show peaks either during day or at night hours.

Another analysis shows that the number of pedestrians passing in four major intersections of the city center of Braga and Guimarães at different time period. Fifteen minutes survey in each intersections were added together to see how many walkers are passing in different time. According to this physical survey result, it can be seen that

Elements of Pedestrian Master Plan. (Source: Portland Pedestrian Plan, 1998).

in Guimarães city center, number of walkers at night are more than Braga city center although Braga city center receives more pedestrians than in Guimarães in other times.

Major Findings and Applications

While there are numerous challenges to pedestrian mobility and sidewalk accessibility, some are more likely to be experienced by small and medium sized cities (Jennifer 2006). Braga and Guimarães are two medium – sized cities in Portugal which are also having problems on sidewalks and walkways at intersections. These problems have been studied through literatures. Considering all the observation surveys in these two cities, relevant problems have been identified too. It has also been observed that some of the mentioned factors worked very well and others are still leading to unpleasant and inconvenient walkways in Braga and Guimarães. The identified walkway problems are now discussed.

– Lack of Pedestrian Planning: Transportation planning, especially in small and medium sized cities, has typically focused on motorized traffic on streets (Jennifer 2006). This situation is not exceptional in Braga and Guimarães. Both municipal authorities have its engineering department that is preparing the city plans. However, pedestrians or bicycling plans are still absent in the municipal master plans. Some renderings sketches can be seen only in the road network plans those consider sidewalks.
– Lack of Walkway Maintenance: It has also been experienced from the observation survey that in Braga and Guimarães, walkways are not well maintained in everywhere. In the city center area, mostly the pavements, color of walkways and continuity of walkways are well maintained. However, the connected pathways are not well maintained in most of the cases. Discontinuation of width and length of walkways offer an inconvenient walking environment for the pedestrians.
– Lack of Enforcement: Parking rules and regulations are quite often violated by the car users especially in the heart of the city center. In Braga, drivers can not bring car in the pedestrian precincts. But in Guimarães, people quite often park their cars for a short time of 15 to 30 minutes with emergency signal lights. Indeed, the law enforcement authority should be visible in the peak hours so that drivers of cars can not park vehicle on sidewalks. Pedestrians have complained this problem during the field survey.

From the study case emerges that the sidewalk has a lack of maintenance when it comes to describe the width. In this case, it has been measured that the sidewalk starts with 1.2 meter wider in the beginning and in the middle it becomes less than 1 meter wide. The construction wall of the building comes into the right of way of the sidewalks and it offers unpleasant and inconvenient sidewalks for the walkers. As a result, the walkers forcefully need to walk on carriage way of cars which decreases the safety of pedestrians.

Furthermore, in some cases sidewalks are taken by the shopkeeper to sell fruit products to the passerby. This situation is very common in the medium sized cities and it also happening both in Braga and Guimarães. The cars are also going very fast at the adjacent sidewalks at almost 30 to 40 km per hour. Pedestrians feel very much uncomfortable to cross this area if two persons are walking in opposite directions.

Placement of unwanted hindrances on sidewalks: It has also been experienced in the studied areas that trees, electric pillars and dustbins are placed on the walkways to create a chaotic situation for pedestrians. In the busy sidewalks in mega cities like Tokyo, Mumbai and Mexico City, this scenario is not that common (Rahaman et. al. 2006). However, in medium-sized cities like Braga and Guimarães in Portugal, some unwanted hindrances have been found even in the city centre streets. In figure 6, it can be seen that a major electric pillar is being placed on the sidewalk. It decreases the width of the walkway and at the same time it decreases the safety of the walkers. Sometimes, the dustbins and beautification trees offer the same problem in small cities.

Lack of political and financial support for pedestrian planning: A major obstacle to achieving good pedestrian facilities is not just planning, it is implementation. Implementation is

Time Segments	Youth (0 to 15)	Young Adults (15 to 40)	Adults (40 to 65)	Elderly (65+)
Morning (upto 12 AM)				
Lunch Hour (12 to 15.00 PM)				
Afternoon (15h – 17h)				
Afternoon(17h-20h)				
Night (20-23h)				
Night (23-2h)				
Night (After 2h)				

Time Segments	Youth (0 to 15)	Young Adults (15 to 40)	Adults (40 to 65)	Elderly (65+)
Morning (upto 12 AM)				
Lunch Hour (12 to 15.00 PM)				
Afternoon (15h – 17h)				
Afternoon(17h-20h)				
Night (20-23h)				
Night (23-2h)				
Night (After 2h)				

Legend:		35% <Medium ≤ 50%	
Less than≤20%		50% <High ≤ 65%	
20% <Medium Low ≤ 35%		Very high> 65%	

City centre areas of both Braga and Guimarães have been surveyed to collect information related to the pedestrian flows - Walking statistics of people in Braga and Guimarães based on age.

achieved through the dedication of resources by the public and from the resources of private property owners (Nelson 1995). In the studied municipalities in Portugal, the resources are mostly allocated to other sectors to negotiate the growing need of urban services like, major infrastructures, housing, schools and shopping areas. However, pedestrian planning is incorporated in the transportation plan in recent times especially in Guimarães, because the city will be the European Capital of Culture in 2012. Certainly it will receive lots of tourists in 2012 and afterwards from home and abroad who will walk and see the city in coming years. Other problems for pedestrians such as bus stop shades on walkways, street furniture, advertisement signs, broken man-holes, car parking on walkways (mostly for short time to drop people or to shop something at the adjacent shops) etc. offer inconvenient pedestrian flow especially in day time. Several pedestrian problems have been identified in the studied areas.

These problems need to be considered in the municipality's mobility or transportation plan. Experiences from the field survey shows that walkers don't like unwanted walking environment especially in the peak hours in the morning and in the evening. To overcome such problems, municipality should consider pedestrians as a major stakeholder in its mobility plans. When the municipality prepares master plan or transportation plan, they should consult with the shopkeepers adjacent to the sidewalks, pedestrians of different age groups and walkway's maintenance people to know more about their problems. This study already included important problems in the studied city centers faced by the walkers. To avoid such unexpected situation on walkways, specific measures can be taken as:

a) Street furniture should be placed in an appropriate position on sidewalks so that it doesn't offer hindrances for smooth pedestrian flow.
b) Parking should be prohibited even for shorter time (including emergency parking) on sidewalks.
c) Switch boxes from telephone and electricity companies should not place on walkways that effectively decrease the width of sidewalks especially in the city center areas.
d) In busy schedule, depending on the pedestrian volumes, city center can be declared as pedestrian precinct.
e) Harmony of walkway colors and construction materials should be well maintained.
f) Bins and litter bags should not be placed in the busy street corners of walkways.
g) Municipality authority should take the responsibility for regular maintenance of sidewalks. Effective width, smooth elevation and landing, smooth surface and

Braga	Students	Professionals	Retired	Unemployed
Morning (7 - 12)				
Lunch (12-15)				
Afternoon (15-17)				
Afternoon (17-20)				
Night (20-23)				
Night (23-2)				
Night (2 and later)				

Guimarães	Students	Professionals	Retired	Unemployed
Morning (7 - 12)				
Lunch (12-15)				
Afternoon (15-17)				
Afternoon (17-20)				
Night (20-23)				
Night (23-2)				
Night (2 and later)				

Legend:		35% <Medium ≤ 50%	
Low ≤ 20%		50% <High ≤ 65%	
20% <Average Low ≤ 35%		Very High> 65%	

Walking statistics of people in Braga and Guimarães based on profession.

unwanted garbage cleaning should be major aspects to do so.

Best practices can be seen in different cities around the world considering the possible problems and threats of walking.

Curbs, edge marking, drainage grates and hand rails on sidewalks are very well placed in the Stockholm city center. Portland Pedestrian Plan has divided the streets according to the nature and planned the sidewalks keeping 'safety first for the pedestrians' in mind.

Pedestrian behavior models have been incorporated in London Pedestrian Master Plan. This model can be useful to restrict the pedestrian activities within the sidewalks (Mordechay et al. 2005). Jaywalkers at the same time will be discouraged to walk on sidewalks haphazardly. Pedestrian' awareness building is another important best practice in Tewkesbury Healthy Town in the UK.

The municipality organized several awareness building programs as a part of their campaign of healthy town in the UK in April 2009 (Active Access 2010).

Conclusion

In last three municipality master plan, there was a lack of people's participation to provide services for them in both cities. In the city center areas in Braga and Guimarães, redevelopment plans have been carried out once in 2004. In both cases, pedestrians were not surveyed directly to know their perception and expectations of walkway environment. It can be considered as a top down approach of planning without considering the views of the local people and users who are using the service. Future research should incorporate the public participation mechanisms in medium sized city centers to provide pedestrian plans in the municipal master plans. People can express their need well and can be considered for future development as well.

Guimarães and Braga are traditionally being considered as pedestrian friendly city centers. They are two important cities in Portugal in terms of culture, tourism, business and service economy, located within a 12 Km distance. Braga has an enormous area of pedestrian precinct in the city center. These walkways are well connected with shopping areas and other city center facilities. People of different ages are coming to the city center for socialization, shopping and recreation purposes.

Guimarães has a medieval city center with connections to the shopping and tourist spots. Adjusted policies can improve the level of walkway services in these two cities if they are taken under consideration by the local authorities in short and medium term basis.

First, the pedestrian plans should be prepared and revised along with the municipality transportation plan. Both Guimarães and Braga are receiving significant number of

tourists every year. Most of the tourist attractions exist within 20 minutes walking distances.
As a result, tourists can also take the advantage of walking within the city in a convenient way if the pedestrian plan can be incorporated into the transport or into the urban planning system. Second, maintenance of the walkways is important at regular interval. In Braga city center area, the walkways are well maintained except for some width and color alterations. In Guimarães city center area, the walkways are offering alteration both in form of width and length.
Broken surfaces and up and down surfaces offer problems for smooth walking opportunities too. For instance, regular maintenance of walkways should be monitored closely by the municipality authority.
Albeit there has been a significant policy shift in which local governments are taking up increased responsibility in ensuring a safe pedestrian environment, much remains to be implemented.
Representations of safer and convenient city walkways thus encourage more people to walk for shorter trips which certainly leads to healthy and carbon neutral city. This study is an attempt to propose a methodology for quick assessment of walking environment problems in medium-sized cities. More empirical research is in demand to further develop this methodology. The importance of this approach is that less time is needed to apprehend the problems, to list and classify them. Likewise, more time can be devoted to problem discussion and finding of solutions within a public participatory atmosphere.

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