Sustainable Mobility Planning and Management: the Rimini case study

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**Introduction**

Rimini, famous for its beaches and *dolce vita*, has two lives:

- **in summertime** it becomes the most renowned seaside resort on the Adriatic Riviera, whereas **in wintertime** local activities as fishing, manufacturing and business prevail, along with manifold events at the local Fair.
Introduction

The need to upgrade the Urban Mobility Plan - UMP must face such a double identity:

it is necessary to plan strategies and interventions to manage both typical seasonal traffic flows and peak phenomena without leaving aside top priorities such as environment and livability.

The co-operation between the Rimini Municipality and the DITS was aimed at developing a new UMP to meet such different requirements.
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Analysis of traffic flows

Modal Split 2005

Motorized vehicles ownership rate (n. of vehicles per 100 inh.): 90.06!
One of the highest in Italy

such a car-dependency required an in-depth analysis of the mobility local habits and recurring patterns

a state-of-the-art survey of traffic flows was needed

two surveys were carried out during the summer 2007 and the winter 2008
**Analysis of traffic flows**

**Traffic flows survey location**

The area was divided into four survey zones:

- 30 spots surveyed for three days long by inductive-loop traffic detectors
- + 20 spots where manual countings occurred

Most of the inductive-loop traffic detectors were located across Zones A (a central residential area) and B (the historic centre).
Modelling activities

Analyses of the local transportation patterns

In order to create scenarios the for UMP, an urban traffic modelling procedure has been applied, aimed at simulating travel behaviours.

In particular, a macro simulation model has been developed for the entire provincial area, differentiating between the “study area” (provincial zone) which has influence on the urban mobility system and the “plan area” (municipality) which is the intervention area.
Modelling activities

Analyses of the local transportation patterns

The zoning

The whole area has been split in 126 zones (zoning based on census tracts, physical barriers and land use), 82 of them within the Rimini municipal area.
Analyses of the local transportation patterns

The supply model development

Links and nodes capacity of the selected network were defined, according to the conventional road classification:

- A: highways,
- B: sub-urban main roads,
- C: sub-urban secondary roads,
- D: urban main roads,
- D-E: inter-district roads,
- E: districts roads,
- E-F: main local roads
- F: local roads

values ranging from 1800 vehicles/hour (highways) to 600-800 vehicles/hour (district and local roads)
Modelling activities

Analyses of the local transportation patterns

The demand model development
The mobility system has been referred, respectively, to systematic (home-to-work and home-to-school) and “non systematic” (leisure, shopping, etc.) trip destination choices, according to data provided by the National Institute of Statistics.

In order to define the transport mode preferences a further data analysis has been carried out, resulting, thus, the Rimini citizens’ preference for private cars, compared to transit, overwhelming.
Modelling activities

Analyses of the local transportation patterns

The model calibration

The summer and winter traffic surveys carried allowed to calibrate the demand model.

Then, it was possible to predict traffic flows over the entire network and the congestion levels during peak periods, referred to an average day.

In winter time: higher levels of congestion along the links around the central historic district. Reasons relies on the unsuitability of such road sections, peculiar of ancient, urban patterns which were not “born” to meet high traffic flows.
Modelling activities

Analyses of the local transportation patterns

The model calibration

In summer time: the congestion level is amplified involving several external areas and affecting, the city main access roads and the waterfront.
Modelling activities

Analyses of the local transportation patterns - simulations
The traffic estimate has been the starting point to evaluate the potential effects of selected measures in the short and medium terms.

Short term scenarios have been developed with the aim to improve the mobility system at two sensitive areas:

- Traffic closure of the ancient Tiberio bridge and its conversion into a pedestrian-only walkway to reduce bottlenecks in the area.
- Traffic closure of the waterfront where a high level of accidents occurs during the summer months (involving pedestrians and cyclists) and its pedestrianization.

More scenarios are under development!
Safety indexes
Sustainability and livability are paramount in areas where tourism plays a major role and not negligible when designing actions to improve sustainability, hence an in-depth analysis was run to understand the safety levels of the road network.

There is an average of about 2,097 accidents per year (5.7 events/day!)

The three main safety indexes:
- **Injuries Index**: \( \frac{n° \text{ of injured travellers}}{n° \text{ of events}} \times 100 \)
- **Fatalities Index**: \( \frac{n° \text{ of dead travellers}}{n° \text{ of events}} \times 100 \)
- **Gravity Index**: \( \frac{n° \text{ of dead and injured travellers}}{n° \text{ of dead and injured travellers}} \times 100 \)

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are below national rates, but…….
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The accident analysis

Black spots analysis

...but there are some recurring black spots

where high traffic flows are recorded

at local roads

at tourist areas as the waterfront

Accidents 2006

0
1 to 10
11 to 20
21 to 30
31 to 40
41 to 50
51 to 60
61 to 70

Kilometers

N
The accident analysis

Black spots analysis

The waterfront

During August 2006 and 2007 (the typical peak seasons) virtually all the accidents involving vulnerable users (pedestrians and bikers, i.e., about 9.5% of the total amount of events) occur along the waterfront and the areas nearby.

Among the injured pedestrians (the bulkiest category of vulnerable users involved) about 17.2% are younger than 18 years old, whereas 32.1% are over 65.
The proper knowledge of traffic and the current road safety levels, so far achieved, prompted decision-makers to devise some UMP general objectives. Needless to say, **disincentivating private traffic appears to be the top priority**.

**New Road Classification**

A prerequisite was the creation of a new road classification consistent with the surveyed functions and traffic flows, size and local environments.

*roads are divided into:*

a) sub-urban through-traffic roads
b) distribution roads
c) urban areas accessing roads
d) urban areas connecting roads
Towards the Urban Mobility Plan - UMP

The goals: slow mobility

a) the creation of a safe and continuous bike network across the whole urban area

Two tasks:
1) to develop appropriate design criteria to make the network suitable to the different environments, typical of Rimini;
2) to plan how to improve the available, 71 km long, bike routes (built in past times without any real planning activity) and how to integrate them into such a new network
Towards the Urban Mobility Plan - UMP

The goals: slow mobility

a) the creation of a safe and continuous bike network across the whole urban area

Three different patterns have been designed, easy to adapt to any area:

1. type A, i.e. “long-distance” routes, across the whole municipal area, designed to link main destinations within the municipal boundaries and outside;
2. type B, i.e. neighbourhoods accessing and/or connecting routes;
3. type C, “local” routes to link destinations within each neighbourhood.

22 km of brand new routes will be provided + 67 km of extra branches to connect the new to the existing facilities, resulting thus in a 160 km long network!
Towards the Urban Mobility Plan - UMP

The goals: slow mobility

b) Traffic calming

It is also necessary to slow down traffic, mostly along those urban and extra-urban roads where higher traffic flows and accident rates have been recorded.

First intervention: an extensive conversion of crossing points into roundabouts as part of a more ambitious goal: the closure of a ring road around the most central areas, designed to avoid through traffic.
The goals: slow mobility

c) Appropriate parking supply for commercial vehicles

It is essential to provide central and tourist areas with an appropriate number of loading/unloading bays, for commercial vehicles which usually park on sidewalks while delivering.

Two lines of actions have been drawn:

a) for the city centre, more restrictive time slots for commercial vehicles entering the area in order to create a Freight Limited Traffic Zone and free access to non-polluting vehicles only

b) for tourist areas, an increase of loading/unloading facilities
The goals: *urban rehabilitation*

The designed waterfront pedestrianization

It is meant to increase safety for all the non-motorized users and, at the same time, to rehabilitate the whole area, by the creation of a car-free environment.

It was modelled how the pedestrianization could affect the whole traffic situation and accordingly the consequences, at urban level, would be negligible.

*Three design proposals*
Conclusions

All the measures above-described will be part of the UPM; some of them will probably evolve, some others will change and/or will be amended also because the end-users participation in the decision-making process is continuous.

So far, virtually all the decisions have been shared and conflicts have been avoided.

The success of the Rimini experience relies on the equally partake of both administrators and citizens in the support of issues as the environmental safeguard, the need to increase livability and to decrease the energy consumption which constitute the leading criteria of the UPM.
Conclusions

It will be also essential to frame the measures into strong regulatory mobility policies, aimed at rebalancing modal split, providing the citizens with effective not-private-car-based options and re-orienting people’s habits toward transit.

Accordingly, more concepts are in progress, among them it is worth stressing:
• the enhancement of the car-sharing service, which is currently operated only across the central areas
• the improvement of the public transport network, in terms of design of bus priority lanes
• the provision of dedicated seasonal shuttle services to the beach facilities
Thank you for your attention

For any further questions, please contact the authors:

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