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Processing Traffic and Road Accident data in two Case Studies of Road Operation Assessment

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Abstract

In recent years a change of paradigm in road operations development has emerged. Increasing congestion on the urban motorway networks has led stakeholders to test innovative practices of road infrastructure use, since strict budgetary constraints and the environmental requirements for sustainable mobility have raised the need not only to limit the building of new infrastructures but also to look for solutions to optimize the existing network. Therefore, on French motorways for instance, new road management schemes are being tested, such as allowing traffic on the hard shoulder during peak periods. Furthermore, recent directives in France on road safety, sustainable development and the preservation of the natural environment have driven local authorities to reduce speed limits on urban highways. Whatever the reasons for change, an exhaustive assessment of new schemes is essential, in order to know what the impact is in terms of traffic and road safety. This paper aims to give methods and results in ex-ante and ex-post safety assessment studies by combining data from various sources (traffic databases, police reports, accident files, weather stations and maps).

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1. Introduction

Recent directives in France on sustainable development and the preservation of the natural environment have led local authorities to reduce speed limits on urban highways. Furthermore, solutions to optimize the existing network have been driven by stakeholders in France, such as allowing traffic on the hard shoulder during peak periods. Whatever the reasons for change, an exhaustive assessment of new schemes is essential, in order to estimate their impact in terms of traffic and road safety. While ex-ante assessment considers potential benefits before the deployment of a new scheme, ex-post assessment checks the real effects of the operations.

Here, we give the method and results of two road operation assessments. The first one concerns a speed limit reduction on an urban motorway network, the aim being to reduce emissions, pollution and accident counts. In this case the ex-ante safety assessment is presented. The second one concerns a hard shoulder running operation on another urban motorway network, the aim being to reduce congestion. Here, the ex-post safety assessment is presented. In both cases, the data used comes from traffic databases, police report and accident files, and also weather data.

Section 2 explores a data driven approach for the ex-ante assessment of a speed reduction on motorways located in the North of France, around the city of Lille. Section 3 presents the before/after study of a road lane management operation, within the framework of the ex-post assessment of a road operation located on motorways around Paris. In both cases, it is necessary to describe the assessed site, the accident and traffic data, the traffic operation and the main results, in order to understand the reasons for and methods of the assessments.

The last section shows what assessment has actually been obtained, and what assessment could be expected, if the data were more exhaustive, and if the range of the experiments were longer in time and wider in space.

2. Safety ex-ante assessment of a French road lane management operation: data driven approach

This section presents an ex-ante assessment of a reduction in speed limit on motorways located in the North of France, around the city of Lille, on the ALLEGRO site. The site and the speed limit reducing operation are described in the first subsection, the data and assessment method are outlined in the 2nd and 3rd subsections respectively, and the results are presented at the end.

2.1. Description of the site and of the speed limit reducing road operation

The site considered in this study includes the Lille urban motorway network, which has two, three or four lanes in each direction. The authorities decided to limit speed, the aim being to preserve the natural environment and to decrease accident counts. Our purpose here is to give a prior estimation in terms of injury and fatality accident counts, i.e. to see whether or not the new measures increase safety.



Figure. 1: Speed limit reduction scheme near Lille

The speed limit will decrease from 130km/h to 110km/h in three motorway areas: A (A25 motorway), C (A23), and D (A27); it will decrease from 110km/h to 90km/h in areas E (A25), F (A1), G (weaving section A22-A27-A23) and I (A22).

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