The aim of this thesis is the assessment of the long term impacts of the implemented policies of M&R in the city of Medellin (Colombia), by evaluating the costs of implementation and service provided to users and make recommendations for improving the effectiveness of maintenance and rehabilitation (M&R).

Maintenance of roads has been a point of concern in the Country over the last decade, since the large investments made has been, in some cases, lost due to poor or inexistent maintenance and rehabilitation policies (M&R). This situation is critical in big cities, where a centralized road agency is in charge of long extensions and is pressured to maintain it in a good condition constantly.

The methodology used for evaluation involves the forecast and evolution of the pavement condition during 30 years under the current policies of intervention and a set of policies, proposed by the author. This forecast is made following the HDM-4 model in a programmed spreadsheet with a given set of parameters that represent the policies of intervention and a database containing the relevant information on the roads based on a 2010 survey that computes the changes in pavement condition for a yearly basis.

The entire computation process was made by designing spreadsheets that covered the full process described in the volume 4 of the HDM-4 manual. The process is divided in 8 spread sheets that carry out the calculation of each individual segment from a starting point at the beginning of the year of analysis, and finishes in a similarly structured spreadsheet with the results at the end of the year after road works are applied.

As for the proposed policy, it was designed based on the findings after forecasting pavement state for a sample of roads individually and focusing on reducing the investments needed while maintaining the pavement surface in a good state. In total four scenarios were modeled, by changing the policies of M&R and the available budget (Unlimited or Constrained).

The results show that after 30 years the policies proposed by the author, which are mainly focused on preventive treatment, were more successful in reducing the need of investment, especially in scenarios with very reduced budget and that the current policies although very similar in the short term, could not provide enough maintenance to low-hierarchy local roads (which constitute most of the roads network).