Abstract

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GIS Approach to Evaluate the Effect of the Development Corridor on the Overall Traffic Operation in Egypt

This study is based on the proposed development corridor project by Dr. Farouk El-Baz which attempt to expand the developed region westward throughout the Valley of River Nile. It is known that there are many problems in most Egyptian roads such as low level of service, traffic jam and not taking into account the crisis of roads maintenance and security. All of these lead to spread of road accidents and increase the number of road casualties year after year. World Health Organization (WHO) says that Egypt is one of the first countries in the rates of road accidents in terms of the number of deaths. Egypt loses about 12 000 lives due to road traffic crashes every year. It has a road traffic fatality rate of 42 deaths per 100 000 population. This is a serious that indicator must be taken into consideration. The aim of the current research is to investigate the impact of such a major super highway on the general movement of vehicle traffic in Egypt especially in the North – South direction. A Geographic Information System (GIS) Approach is Selected for its suitability for such a problem at hand. Firstly, the Selected alignment of the proposed developed corridor is digitized, and linked to the overall digitized national highway network of Egypt. The digitized process included the twelve branches highways throughout the River Nile Valley. Attribute tables were established using GIS ArcMap, they consisted of some columns called fields, these fields contained road lengths, road names, governorates where roads are located, as well as road widths, the number of lanes in each road and road speeds. As a result of distances and speeds data, average travel time is calculated by using the equation of time equal distance divided by speed. Network Analyst tool is one of the GIS tools, it is used for analyzing the given data that has been ed and output of results. The Scenario of With / Without Development Corridor is adopted to illustrate the impact of the project on different proposed expected journey linking Egypt between North regions [major harbours] and south regions [potential for development projects]. Also, the degree of development of the proposed super highway is considered in the study through varying design speed. The impact of the proposed project is presented in details on the Traveled Distance / Travelled time plot for different suggested Origin – Destination trips. The study involves the path of Nagaa Hammadi with both of Alexandria Port and the proposed port in El-Alemein, as well as the path of Lake Nasser with both of them. The thesis will study 16 cases for each path, these cases depend on the effect of delay time as a result of traffic jam at grade intersections, as well as the factor of with and without Development Corridor, and if it will be created, taking influence Development Corridor design on the basis of different speeds. Already there has been a clear impact when implementation of Development Corridor on the main road network through the examples that will be studied within the thesis, but also other examples will be shown in Appendix (D). Whenever taking into account the increment of speed factor of the development corridor, this leads to a direct effect on travel time, also leads to increase the percentage of Development Corridor length which is used throughout the trip length. Also the percentage of the used length from the north-south highway increased.