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ABSTRACT

Environmental Impact Assessment, in its widest sense, is the means by which environmental concerns can be taken into account throughout the life of a development project, starting from the initial concept through the detailed design, construction and operation to the eventual restoration and reuse of the land. The EIA is not a scientific research by itself, but it depends on the results of the scientific research and the basics of the decision making process.

Asphalt is the corner stone of an industry that has built highways all around the world. Almost all asphalt used today is derived from the bottom of the barrel (the last cut in the petroleum refinery after naphtha, gasoline, kerosene, and other fractions have been removed from crude oil). Asphalt Cement is a very viscous material at room temperature, so it is hard to blend it with aggregate since it will not coat the aggregate particles. Therefore both aggregate and Asphalt Cement should be heated to a temperature between 140-160 degrees Celsius to decrease Asphalt Cement viscosity and help coating aggregate particles, the mixture is called Hot Mix Asphalt (HMA). The gaseous emissions associated with HMA production are hazardous. As these emissions are hazardous, research for alternative methods of mixing asphalt at less temperature had to be attempted. EIA for road construction projects in Egypt is very limited; therefor establishing guidelines for the EIA of road construction projects in Egypt is the first objective. The second objective of this thesis is to evaluate the Warm Mix Asphalt technique as an alternative for Hot Mix Asphalt and weather it could be practically used in Egypt presenting an environmental study and an economical comparison between both techniques.

The conclusion drawn from the information about warm mix asphalt's advantages and disadvantages, general information about Egypt and the results from the field research, the survey and the analysis, is that warm mix asphalt is a viable option for the paving industry in Egypt. Guidelines for environmental impact assessment for road construction in Egypt were also established in this thesis.

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LIST OF ABBREVIATIONS

HMA	Hot Mix Asphalt
WMA	Warm Mix Asphalt
EIA	Environmental Impact Assessment
EEAA	Egyptian Environmental Affairs Agency
API	American Petroleum Institute
EPA	The US Environmental Protection Agency
DBM	Dense Bitumen Macadam
PM	Particulate Matter
PM10	PM (less than 10 micrometers in aerodynamic diameter)
HAP	Hazardous Air Pollutant
SO2	Sulphur Dioxide
NOx	Nitrogen Oxides
CO	Carbon Monoxide
CO2	Carbon Dioxide
VOC	Volatile Organic Compounds
NIOSH	National Institute of Occupational Safety & Health
NTP	National Toxicology Program
WMO	World Meteorological Organization