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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; therefore 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 whether 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.

TABLE OF CONTENTS

	Page
Acknowledgements	I
Abstract	II
Table of Contents	III
List of Tables	VII
List of Figures	VIII
List of Abbreviations	X
• Chapter 1: Introduction	1
1.1 General	1
1.2 Problem Statement	1
1.3 Research Objectives	2
1.4 Scope of Research	2
1.5 Methodology	3
1.6 Thesis Format	6
• Chapter 2: Literature Review	7
2.1 Pavement Construction	7
2.1.1 General	7
2.1.2 Materials Used	7
2.1.2.1 Asphalt Concrete	7
2.1.2.2 Hot Mix Asphalt Concrete	9
2.1.2.3 Construction Aggregates	11
2.1.3 Equipment Used	12
2.1.4 Method of Construction	14
2.1.4.1 Method Statement	16
2.2 Emissions	17
2.2.1 Asphalt Fumes.....	18
2.2.2 Human Health Effects	18
2.3 Environmental Issues	18
2.3.1 Impacts of Pollution	19
2.3.2 Air Pollution.....	19
2.3.3 Major Air Pollutants.....	20
2.3.4 Global Warming.....	21
2.3.4.1 Introduction	21
2.3.4.2 Greenhouse Gases	22
• Chapter 3: Guidelines For Environmental Impact Assessment For Road Construction Projects in Egypt	27
3.1 Environmental Impact Assessment	27
3.1.1 What is EIA?	27
3.1.2 Description of Project	29

3.1.3	Description of Environmental Background and Identification of Impacts	30
3.1.4	Considering Alternatives	30
3.1.5	Screening	31
3.1.6	Scoping	33
3.1.7	Prediction of Impacts and Evaluation of Mitigation Strategies ..	33
3.2	Guidelines For Writing the EIA Report	34
3.2.1	Non-Technical Executive Summary	35
3.2.2	Description of The Proposed Road Construction Projects	35
	3.2.2.1 Objectives and Scope of The Proposal	35
	3.2.2.2 The Location	36
	3.2.2.3 Detailed Description & Layout if The Proposed Project	36
	3.2.2.4 Site Preparation and Construction	37
3.2.3	Background Information	38
	3.2.3.1 Legislative Framework	38
	3.2.3.2 Methodology	38
	3.2.3.3 Public Participation	39
	3.2.3.4 Consideration of Alternatives	39
3.2.4	Description of The Existing Environment “The Baseline”	40
	3.2.4.1 The Overview	40
	3.2.4.2 Land Characteristics and Use	41
	3.2.4.3 Landscape Characteristics and Existing Views	41
	3.2.4.4 Flora and Fauna	41
	3.2.4.5 Water Including Hydrology, Groundwater and Water Quality	42
	3.2.4.6 Air Quality	42
	3.2.4.7 Noise Levels	43
	3.2.4.8 Antiques and Other Sites of Historical & Cultural Importance	43
	3.2.4.9 Social & Economic Context	43
	3.2.4.10 Existing Transportation Infrastructure and Traffic Flows	44
	3.2.4.11 Existing Utilities Infrastructure and Usage	44
3.2.5	Prediction of Impacts and Evaluation of Significant Environmental Effects	44
	3.2.5.1 Basic Methodology	44
	3.2.5.2 Land take	46
	3.2.5.3 Construction Works	47
	3.2.5.4 Economic Impacts during Construction	48
	3.2.5.5 Economic Impacts during Operation	48

3.2.5.6	Dust	48
3.2.5.7	Gaseous Emissions to Air	49
3.2.5.8	Discharge to Water	50
3.2.5.9	Waste Disposal	50
3.2.5.10	Noise	51
3.2.5.11	Traffic	51
3.2.5.12	Services and Infrastructure	52
3.2.5.13	Risk Assessment	52
3.2.6	Mitigation	52
3.2.6.1	Mitigation Strategy	52
3.2.6.2	Specific Mitigation Measures	53
3.2.6.3	Environmental Management Plan	54
3.2.7	Conclusion	55
3.2.8	References	56
• Chapter 4: Warm Mix Asphalt	57
4.1	Introduction	57
4.2	Background	57
4.2.1	History of Warm Mix Asphalt	57
4.2.2	Potential Warm Mix Asphalt Benefits	59
4.2.2.1	Energy Consumption	59
4.2.2.2	Emissions	59
4.2.2.3	Viscosity	61
4.3	Warm Mix Asphalt Technologies	62
4.3.1	WAM Foam	64
4.3.1.1	Environmental Benefits	65
4.3.1.2	WAM Foam Summary	65
4.3.2	ASPHA-MIN ZEOLITE	66
4.3.2.1	Environmental Benefits	68
4.3.2.2	ASPHA-MIN ZEOLITE Summary	68
4.3.3	SASOBIT WAX	69
4.3.3.1	Environmental Benefits	73
4.3.3.2	Sasobit Wax Summary	73
4.4	Warm Mix Asphalt Advantages and Disadvantages	74
4.4.1	Emissions	74
4.4.2	Energy Consumption	75
4.4.3	Mixture Viscosity	75
4.4.4	Summary of Advantages and Disadvantages	76
4.5	Economic Issues	78
• Chapter 5: Field Research and Survey	81
5.1	Field Research	81
5.2	The New Runway Project (Cairo International Airport)	82
5.2.1	The Asphalt Plant	

5.2.1.1	General Information	83
5.2.1.2	Plant Location	84
5.2.1.3	Plant Classification	85
5.2.1.4	Mixing Plant Operation	86
5.2.1.5	Environmental Remarks and Concerns	86
5.2.2	HMA Transportation	87
5.2.3	HMA Placing in Site	87
5.2.3.1	Environmental Remarks and Concerns	88
5.3	Cairo Suez Road Maintenance Project	89
5.3.1	Asphalt Plant	89
5.3.1.1	Asphalt Plant Location	90
5.3.1.2	Plant Classification	91
5.3.1.3	Mixing Plant Operation	92
5.3.1.4	Environmental Remarks and Concerns	92
5.3.2	HMA Transportation	93
5.3.3	HMA Placing in Site	94
5.3.3.1	Environmental Remarks and Concerns	95
5.4	Field Research Conclusions	95
5.5	Survey	96
5.5.1	Sample Size	96
5.5.2	Survey Results	97
5.5.3	Survey Discussion	103
5.5.4	Survey Analysis	105
5.5.4.1	Survey Analysis Remarks	108
•	Chapter 6: Results & Analysis	109
6.1	Introduction	109
6.2	Choosing a Method	109
6.3	Appropriateness of Methods For Developing Countries	110
6.4	Matrices	111
6.4.1	Leopold Matrix	112
6.4.2	Matrix Building	113
6.4.2.1	Project Stages	113
6.4.2.2	Environmental Impacts	113
6.4.3	Magnitude and Importance Scale Implementation	115
6.5	Results Discussion	124
6.6	Analysis & Relationships	124
•	Chapter 7: Conclusions and Recommendations	134
7.1	Conclusions	134
7.2	Recommendations	135
•	References	136
•	Appendix (A)	139

LIST OF TABLES

Table No.	Page
3.1 Required groups to make an EIA report	30
3.2 Category B Projects (Grey List)	34
3.3 Category C Projects (Black List)	34
4.1 Cost Comparison Between HMA and WMA Methods	88
6.1 Environmental Impact Categories	122
6.2 Matrix Analysis of The Environmental Impacts of HMA Paving	127
6.3 Matrix Analysis of The Environmental Impacts of WMA Paving	131

LIST OF FIGURES

Figure No.	Page
2.1 The composition of base crude oil from which asphalt is refined	8
2.2 Batch Mix Plant	10
2.3 Drum Mix Plant	11
2.4 Asphalt Paver Fed By a Dump Truck	12
2.5 Vibratory Roller Compactor	13
2.6 Pneumatic Roller Compactor	13
2.7 Prime & Tack Coat Spraying Vehicle	13
2.8 Asphalt Pavement Layers (1)	14
2.9 Asphalt Pavement Layers (2)	14
2.10 Asphalt Emissions During Placing	17
2.11 Greenhouse Gas Emissions By Country	22
2.12 Greenhouse Emissions Causes	24
2.13 The Greenhouse Effect	26
4.1 Feeder (right) and an existing fiber addition line for Aspha-Min zeolite	67
4.2 Sasobit Wax Pallets	70
4.3 Pellet packets and distribution box (blue box in the center)	70
4.4 Plant retrofitted for Sasobit wax addition	71
4.5 Distribution box with part of augers showing	71
4.6 Sasobit flowing from distribution box to feeder tube	72
4.7 Surface course mix with Sasobit wax (1)	72
4.8 Surface course mix without Sasobit wax (2)	73
5.1 The New Runway Project (Cairo International Airport) (1)	82
5.2 The New Runway Project (Cairo International Airport) (2)	82
5.3 The New Runway Project Asphalt Plant	83
5.4 The New Runway Project Map	84
5.5 Batch Mix Asphalt Plant	85
5.6 Asphalt Finisher	87
5.7 Roller Compactor	87
5.8 Cairo Suez Road Maintenance Project Map	89
5.9 Kattameya Asphalt Mixing Plant Map	90
5.10 Kattameya Asphalt Mixing Plant (1)	91
5.11 Kattameya Asphalt Mixing Plant (2)	91
5.12 Kattameya Asphalt Mixing Plant (3)	91
5.13 Kattameya Asphalt Mixing Plant (4)	91
5.14 Uncovered Asphalt Dump Trucks (1)	93
5.15 Uncovered Asphalt Dump Trucks (2)	93
5.16 Placing of HMA by Day	94
5.17 Placing of HMA by night	94
6.1 Magnitudes of Dust Impact When Using Both Methods.....	125
6.2 Magnitudes of Temperature Increase Impact When Using Both Methods.....	125
6.3 Magnitudes of Gaseous Emissions Impact When Using Both Methods	126
6.4 Magnitudes of Noise Impact When Using Both Methods	126

6.5 Magnitudes of Solid & Hazardous Waste Impact When Using Both Methods.....	127
6.6 Magnitudes of Economic Impact When Using Both Methods	127
6.7 Magnitudes of Production Rate Impact When Using Both Methods	128
6.8 Magnitudes of Workers Safety Impact When Using Both Methods	128
6.9 Magnitudes of Workers Health Impact When Using Both Methods.....	129
6.10 Magnitudes of Workers Support Impact When Using Both Methods.....	129
6.11 Magnitudes of Public Safety Impact When Using Both Methods.....	130
6.12 Magnitudes of Public Health Impact When Using Both Methods	130
6.13 Magnitudes of Public Support Impact When Using Both Methods	131
6.14 Magnitudes of Field Acceptance Impact When Using Both Methods	131
6.15 Magnitudes of Fuel & Energy Usage Impact When Using Both Methods	132
6.16 Magnitudes of Total Impact When Using Both Methods.....	132
6.17 Importance of each environmental impact for each paving stage	133

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
SO ₂	Sulphur Dioxide
NO _x	Nitrogen Oxides
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
VOC	Volatile Organic Compounds
NIOSH	National Institute of Occupational Safety & Health
NTP	National Toxicology Program
WMO	World Meteorological Organization